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Fourth Annual Report

OF THE

BOSTON WATER BOARD.

1880.

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FOURTH ANNUAL REPORT

OF THE

BOSTON WATER BOARD,

FOR THE

YEAR ENDING APRIL 30, 1880.

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CITY OF BOSTON.

FOURTH ANNUAL REPORT

OF THE

BOSTON WATER BOARD,

FOR THE YEAR ENDING APRIL 30, 1880.

Office of Boston Water Board,
May 1, 1880.

To the City Council of the City of Boston: —

The Boston Water Board respectfully submit their fourth annual report, including reports from the City Engineer, Water Registrar, Clerk of the Board, Superintendents of the Eastern and Western Divisions of the Cochituate works, and from the Clerk and Registrar and the Superintendent of the Mystic Department.

The reports of these officers are full and explicit in regard to the details of the work accomplished in the several portions of the Boston Water Works during the past year. The Board will confine themselves to a general review of the condition of the works, the necessity for immediate extension in certain directions, and some of the most important questions of administration which have arisen since the date of their last report.

As far as the general condition of the lakes, basins, aqueducts, reservoirs, and all the existing structures, with their many appliances for the distribution of water, is concerned, the Board are happy to state that they have never been in a more satisfactory condition. The principal exceptions are the Cochituate aqueduct and the Brookline reservoir, which have often been alluded to in past reports. It is the intention of the Board to begin systematic repairs on these structures at the first opportunity.

A large amount of work has been accomplished during the past year in finishing the storage basins connected with the Sudbury-river supply, and those portions of the dams which were in process of construction at the date of the last report. Basins 1, 2, and 3, including the gate-houses, are now entirely completed, and are in daily use for the supply of the city.

Consumption of Water.

The average daily consumption of water for the year 1879, including the Mystic Works, was 34,579,370 gallons, — an increase of 9 per cent. over the consumption of 1878. The increased consumption from the Cochituate and Sudbury river supplies was 10.7 per cent. in excess of the previous year, and amounted to over 25,000,000 gallons per day. This excessive use of water has caused the Board no little anxiety, and it is evident that steps must be taken, at once, both to stop its wanton waste and to supply works to meet legitimate and largely-growing demands.

In the original scheme for the "Additional Supply," it was estimated that seven storage basins would be required in the Sudbury water-shed to secure a supply of 40,000,000 gallons per day; but that for some years a supply of 20,000,000 gallons would be sufficient, and that this amount would be secured by the construction of the three lowest basins on the river. These, already built, are now furnishing the amount of water estimated, but it is clear to the minds of the Water Board that before a new basin can be built and properly prepared for service, including the loss of two or three working seasons, its services will be imperatively needed. The Board, therefore, unanimously urge the City Council to take immediate steps towards the construction of an additional basin.

The Engineer estimates that the saving in the actual building of the new works over the estimated cost would more than pay for the basin asked for.

An inspection of the figures connected with the Mystic department will also show that the capacities of this source of supply have been fully reached, and that some plan must be devised to increase the supply materially. The Board have had under consideration several methods for accomplishing this end, and, as soon as that scheme which will promise the best results for the interests of the city has been decided upon (and it must be determined soon), the City Council will be asked for a definite appropriation. The Board, however, are inclined to believe that, in view of the large ex-

penditures already made for the purification of the Mystic water, its generally pure nature, and the growing demands necessitating the husbanding of all available resources, the Mystic supply should be retained and enlarged, either by connection with the Cochituate works, additional storage facilities, or by acquisitions from an entirely new source.

SUDBURY RIVER.

Sudbury river has supplied to the city nearly 4,000,000,000 gallons, or an average daily supply of over 10,000,000 gallons. A small portion of this amount was diverted into Lake Cochituate, but the greater part was sent directly to Chestnut Hill reservoir.

Basins Nos. 1 and 3 were filled early in the year, but owing to delays in the construction of Basin No. 2, that basin was not filled until late in the summer.

On May 2, 1879, the contract for building the gate-house at Dam No. 1 was awarded to Messrs. Norcross Bros., of Boston. This structure was finished Feb. 25, 1880. On June 19, 1879, the contracts for building the gate-houses at Dams 2 and 3 were awarded to James Fagan and B. F. Dewing, respectively, and they were completed Jan. 24, 1880. The buildings were designed by the City Architect.

A large portion of the time of the Board has been taken up in the settlement of unadjusted claims against the city for land and water damages. Some of these were of an intricate and delicate character, but it is believed that they have been settled for the best interests of the city. A few cases still remain unsettled, and are now in the hands of the City Solicitor for trial.

The question of the expediency of removing the loam from the bottom of the storage basins has been brought before the Board several times during the year. On June 13, 1879, the Park Commissioners addressed a communication to them, representing the desirability of removing the loam for park purposes, and enclosing estimates and a report from the City Engineer in relation to the matter. These documents were at once forwarded to the City Council, with a request from the Water Board for a special appropriation; but as no action was arrived at, the basins, later in the season, had to be filled, to insure a supply for the city.

On April 12, 1880, in answer to an order from the City Council, another report was made, including one from the City Engineer, reviewing the question and demonstrating the impossibility of accomplishing anything very satisfactory

in this direction under the present condition of the water supply.

Lake Cochituate.

All the water available from this source of supply has been run to the city steadily during the year. The surface was drawn down about seven feet during the season of 1879, but was filled again during the spring of the present year. A number of important improvements have been made on this portion of the works. Two new dams have been built to flow large areas of submerged meadows, which were formerly exposed whenever the lake was drawn down. The cost of these dams was insignificant compared with the advantage gained. The settling basins at Pegan brook have also been cleaned out and their dams repaired, as more fully set forth elsewhere.

A new dam at the outlet of the lake will be required in the near future, and it is the intention of the Board to accomplish this work as soon as possible. In the mean time the present dam will be temporarily modified.

For several years the dangers threatening the purity of the water, by the contamination of the brooks entering the lake, have engaged the attention of the Board, but there seemed to be no legal solution of the difficulties which arose until the Statute of 1878 was passed. This Act gave the State Board of Health direct control over cases of sewage pollution, and under this law the most energetic measures have been pursued for the purpose of eliminating, as far as possible, all dangers from sewerage matter. To this end the Superintendents and Engineers of the several departments were directed to report to the Board the name of every party known to be polluting the sources of supply, together with descriptions of their premises. As far as these reports related to Lake Cochituate it was found, as expected, that Pegan brook, in Natick, demanded the earnest attention of the city, and, acting under the advice of the City Solicitor, proceedings were begun against certain parties refusing to comply with the formal request of the Board, to cease polluting the brook.

This action was taken only after mature deliberation, and when consultation with the selectmen of Natick had failed to secure any satisfaction to the city. These cases have not yet been decided.

An attempt was made during the period of low water last year to repair the upper end of the Cochituate aqueduct; but, owing to the rapid rise of the water in the lake, the undertaking was postponed. No formal examination of the

brick-work has been made, but from a cursory inspection in boats it is believed that no more serious defects exist in this aqueduct than at the date of the last report.

Chestnut-Hill Reservoir.

This reservoir is in remarkably good order. The small basin at Brookline will be cleaned out and the masonry of the gate-houses repaired when the new 48-inch main is laid. Authority for laying this main was obtained from the Legislature on March 19, 1880, and from the City Council on April 23, 1880. The Board proceeded at once to contract for the pipes, and it is expected that the work will be completed before another season.

A 30-inch main will also be laid through Francis street in Brookline, connecting the 40-inch main on Brookline avenue with the 36-inch and 30-inch mains on Tremont street.

The 48-inch main is to run from Chestnut-Hill reservoir to the junction of Beacon street and Brookline and Brighton avenues, where it will join the old 40-inch main. The laying of these pipes will greatly assist in maintaining the pressure in the entire low-service supply of the city.

The distributing pipes have been extended during the year by the laying of about 8 miles additional, making a total of more than 372 miles laid to date.

High-Service Supply.

The total quantity of water pumped during the year 1879 was 820,827,210 gallons, against 753,162,900 gallons for the preceding year, — being an increase of 9 per cent.

As will be seen by an inspection of the Engineer's report, no portion of the works has been taxed to so great an extent by the extraordinary increase in consumption as the high-service supply. The former Engineer repeatedly called the attention of the Board and the City Council to the dangers that might result from postponing too long the reconstruction of the high-service works, and made several interesting reports on this subject, which will be found in City Document No. 117, 1875, and No. 80, 1876.

The water has been pumped during the past year at a very much reduced cost, and the working of the three-million Worthington pump has been very satisfactory; but already the machinery at the command of the Board has been taxed nearly to the limit of safety, and the attention of the City Council is called to the imperative necessity for beginning the new high-service works already recommended in past years. No further delay would be prudent in view of the dangers to which this portion of the distribution is liable

from inadequate pumping facilities. Particular attention is called to the statements of the Engineer on this subject, which are indorsed by the Board.

Mystic Department.

The works connected with this department are in a satisfactory condition. A portion of the grounds has been improved by grading and tree-planting. During the period of low water in November a quantity of muck was removed from some shallow flowage of the lake near the Mystic station in Winchester. The conduit was thoroughly cleaned in October, and a large growth of vegetable matter removed. A decided improvement has resulted in the screenings.

The engines have been kept in good working order, requiring only some minor repairs. They pumped during the year 1879, 3,242,848,221 gallons, at a cost of $5\frac{3}{10}$ cents per million gallons raised one foot. The attention of the City Council is called to the statement of the Engineer that the safe pumping capacity of these works has also been reached.

Over three miles of cement pipes have been replaced with cast-iron. The diameters of the pipes relaid have been generally larger than of those taken up.

In July, 1879, a very disagreeable vegetable growth of algæ appeared in Horn Pond, and spread quickly throughout the distribution of the system, causing great inconvenience to the water-takers. The evil was beyond any known remedy. The best experts were employed to investigate as to the cause, but without practical results. That the appearance of these plants is in no measure caused by sewage or other pollution is shown by the fact that the same growth has appeared, in a precisely similar manner, in one of the basins of the Sudbury-river supply, on Stony brook, a district free from danger of this sort.

Extensive experiments were made by the Engineer, to determine whether or not it would be practicable to filter the water, and a report was made to the City Council on Dec. 1, 1879, to which reference may be made for further particulars. The Board intend to continue investigations into the circumstances attending the appearance of this unfortunate and phenomenal growth of vegetable matter as opportunity may offer.

All the drainage of a very objectionable nature has been diverted during the year, either into the Mystic sewer, or by independent cesspools. None of the tanneries now discharge into the streams direct, as was formerly the case. Some of the owners complied with the demands of the Board only after every means had been resorted to to evade them. Pro-

ceedings were commenced against several parties, before the State Board of Health, but the cases were withdrawn after every requirement of the Board had been met.

The importance of increasing the supply of the Mystic Department, either by connection with the Cochituate works or otherwise, has been already discussed; but in this connection it may be well to state, that, on August 15, 1879, the City Council directed the Water Board to report the cost of connecting the Cochituate and Mystic supplies; and that, on August 18, 1879, the Board reported back the estimate of the Engineer, which, exclusive of the cost of the 48-inch main from Chestnut Hill reservoir to the corner of Harvard street in Brookline, at which point the connection would be made, amounted to $340,000, and, including the 48-inch main, to $452,000; but the latter amount also provided for the cost of a pipe sufficiently large to supply the City of Cambridge.

EARNINGS OF THE WORKS.

The total receipts of the Cochituate Water Works, from all sources for the year ending April 30, 1880, are as follows, viz.: —

Stock on hand May 1, 1879	$88,780 34
Income from sales of water	1,044,780 52
Income from shutting off and letting on water and fees	3,612 25
Sundry receipts by Water Board	61,095 91
Profits in manufacturing hydrants, etc., etc., for the year ending March 15, 1879	3,743 68
	$1,202,012 70

The total amount charged to Cochituate Water Works for the year ending April 30, 1880, is as follows, viz.: —

Current expenses	$171,160 80	
Extension of works paid for out of income	67,884 25	
Interest on funded debt	643,037 93	
Amount paid Mystic Water Works for water furnished East Boston	44,013 24	
Refunded main pipe assessment	50 00	
		926,146 22
Balance April 30, 1880		$275,866 48

Stock on hand April 30, 1880,	$61,159 24	
Paid to Cochituate Water Sinking Fund, April 30, 1880	214,707 24	
		$275,866 48

The outstanding Cochituate Water Loans at this date, exclusive of the Additional Supply, are as follows: —

5 per cent. Sterling Loan (£399,500)	$1,947,273 98		Due Oct.	1, 1902
5 per cent. Loans	100,000 00	100,000	Due April	1, 1906
5 per cent. Loan	1,000 00	1,000	Due Oct.	1, 1907
		16,000	Due Jan.	1, 1880
		50,000	Due July	1, 1880
		300,000	Due Dec.	1, 1897
		200,000	Due Dec.	12, 1897
		450,000	Due June	16, 1898
		540,000	Due Oct.	1, 1898
		250,000	Due April	1, 1899
		625,000	Due Jan.	1, 1901
		688,000	Due April	1, 1901
		330,000	Due July	1, 1901
6 per cent. Loans	4,319,000 00	413,000	Due April	1, 1903
		38,000	Due April	1, 1904
		161,000	Due Jan.	1, 1905
		142,700	Due April	1, 1905
		6,000	Due Oct.	1, 1905
		82,550	Due Jan.	1, 1906
		8,750	Due April	1, 1906
		4,000	Due Oct.	1, 1906
		8,000	Due Jan.	1, 1907
		5,000	Due April	1, 1907
		1,000	Due July	1, 1907
4 per cent. Loan	280,000 00	280,000	Due April	1, 1910
	$6,647,273 98			

The total receipts of the Mystic Water Works from all sources for the year ending April 30, 1880, are as follows, viz.: —

Stock on hand, May 1, 1879 . . .	$19,968 58
Income from sales of water	258,552 62
Income from shutting off and letting on water and fees	823 00
Sundry receipts by Water Board . . .	5,483 67
	$284,827 87

The total amount charged to Mystic Water Works for the year ending April 30, 1880, is as follows, viz.: —

Amount carried forward,	$284,827 87

Amount brought forward,		$284,827 87
Current expenses . . .	$96,079 36	
Extension of works paid for out of income	1,702 92	
Interest on funded debt . .	63,865 00	
Amount paid Chelsea, Somerville, and Everett, under contracts	24,409 83	
Amount refunded Cochituate Water Works, for water furnished East Boston from Cochituate works, from July 23 to Dec. 24, 1879 . .	19,172 70	
Stock purchased but not used .	12,052 95	
		$217,282 76
Balance, April 30, 1880		$67,545 11

Stock on hand, April 30, 1880,	$14,547 05	
Paid to Mystic Water Sinking Fund, April 30, 1880 . .	52,998 06	
		$67,545 11

The outstanding Mystic Water loans at this date are as follows:—

6 per cent. currency Mystic Water Loans . . .	$613,000 00	$26,000 Due Oct. 1, 1881 1,000 Due April 1, 1885 35,000 Due April 1, 1886 60,000 Due Oct. 1, 1886 50,000 Due Oct. 1, 1887 3,000 Due April 1, 1888 100,000 Due July 1, 1890 51,000 Due Jan. 1, 1891 139,000 Due July 1, 1891 67,000 Due Jan. 1, 1892 42,000 Due July 1, 1892 39,000 Due July 1, 1893
5 per cent. currency Mystic Water Loans . . .	410,000 00	100,000 Due Oct. 1, 1882 202,000 Due Oct. 1, 1883 6,000 Due Oct. 1, 1893 102,000 Due April 1, 1894
6 per cent. currency Mystic Sewer Loans	130,000 00	130,000 Due April 1, 1886
	$1,153,000 00	

MYSTIC SEWER.

Balance of loan, April 30, 1879 . . .		$23,781 64
Receipts.		
Sales of old materials, etc.		1,457 37
		$25,239 01
Payments.		
To Mystic Water Sinking Fund	$1,457 37	
Construction and land-damages	2,027 28	
		$3,484 65
Balance unexpended April 30, 1880 . .		$21,754 36

The following statement shows the appropriations by the City Council for an additional supply of water, with the loans issued to meet them, and the amount of expenditures to this date: —

ADDITIONAL SUPPLY OF WATER.

APPROPRIATIONS.

Oct. 21, 1871. — Transfer from Reserved Fund .		$10,000 00
Apr. 12, 1872. — Order for Treasurer to borrow .		100,000 00
Apr. 11, 1873. — " " " .		500,000 00
Feb. 26, 1875. — " " " .		1,500,000 00
July 1, 1876. — " " " .		2,000,000 00
Apr. 20, 1878. — " " " .		600,000 00
Apr. 11, 1879. — " " " .		350,000 00
Total appropriations to April 30, 1879 . .		$5,060,000 00
Oct. 1, 1875. — Premium on $1,000,000 bonds, under order of Feb. 26, 1875 .	$83,700 00	
April 1, 1876. — Premium on $452,000 bonds, under order of Feb. 26, 1875	47,786 80	
Oct. 1, 1876. — Premium on $2,000,000 bonds, under order of July 1, 1876 . . .	221,400 00	
		352,886 80
Amount carried forward,		$5,412,886 80

Amount brought forward,		$5,412,886 80
EXPENDED.		
1871–72	$2,302 81	
1872–73	61,278 83	
1873–74 including $20,897.50 discount on bonds sold January, 1874	114,102 77	
1874–75	224,956 68	
1875–76	783,613 49	
1876–77	1,924,060 24	
1877–78	1,257,715 26	
1878–79	635,658 08	
1879–80	213,350 97	
		5,217,039 13
Balance of appropriations unexpended April 30, 1880		$195,847 67

Balance of loans April 30, 1879	$59,198 64
Receipts.	
Sales of land, etc.	$3,048 99
New loan issued	350,000 00
	$412,247 63

Payments.		
To sinking fund	$3,048 99	
Sundry payments for construction, land-damages, etc.	213,350 97	
		$216,399 96
Balance unexpended April 30, 1880		$195,847 67

The outstanding loans which were made on account of Additional Supply of Water are as follows: —

4 per cent. Loans,	$670,000	$82,000	Due July 1, 1908
		588,000	Due April 1, 1908
5 per cent. Loans,	3,452,000	1,000,000	Due Oct. 1, 1905
		452,000	Due April 1, 1906
		2,000,000	Due Oct. 1, 1906
5 per cent. Loan,	12,000		Due April 1, 1908
6 per cent. Loans,	648,000	100,000	Due July 1, 1902
		492,000	Due April 1, 1903
		8,000	Due Jan'y 1, 1904
		48,000	Due July 1, 1905
4½ per cent. Loan,	268,000		Due Oct. 1, 1908
	$5,050,000		

In conclusion, the Board desire to place upon record their regrets at the resignation of Mr. Jos. P. Davis, the late City Engineer. Thoroughly skilled in every detail connected with water supply, and deeply interested in the proper development of the water-works system, the loss of his counsel will be felt no more sincerely by any department of the city than by this Board.

LEONARD R. CUTTER, *Chairman*,
ALBERT STANWOOD,
FRANCIS THOMPSON.

REPORT OF THE CLERK.

OFFICE OF THE BOSTON WATER BOARD,
BOSTON, May 1, 1880.

LEONARD R. CUTTER, ESQ.,
Chairman of the Boston Water Board: —

SIR, — The following is a statement of the receipts and expenditures of the Boston Water Board for the financial year ending April 30, 1880: —

RECEIPTS.

On account of Cochituate Water Works .		$1,109,488 68
" " Additional Supply of Water .		3,048 99
" " Mystic Water Works . .		264,859 29
" " Mystic Sewer . . .		1,457 37
		$1,378,854 33
Balance of loans unexpended April 30, 1879, Additional Supply of Water . .	$59,198 64	
Mystic Sewer . . .	23,781 64	
New loans, Additional Supply of Water	350,000 00	
Appropriation Chestnut Hill driveway, 1879–80 . .	3,000 00	
Stock purchased in previous years, Cochituate Water Works	92,524 02	
Mystic Water Works . .	19,968 58	
		548,472 88
		$1,927,327 21

EXPENDITURES.

Current expenses, Cochituate Water Works . . .	$171,160 80	
Current expenses, Mystic Water Works . . .	96,079 36	
Amounts carried forward,	$267,240 16	$1,927,327 21

Amounts brought forward,	$267,240 16	$1,927,327 21
Extension of Cochituate Water Works	67,884 25	
Extension of Mystic Water Works	1,702 92	
Stock on account Mystic Water Works, not used .	12,052 95	
Interest on Cochituate Water Loans	643,037 93	
Interest on Mystic Water Loans	63,865 00	
East Boston contract, account Cochituate Water Works .	44,013 24	
Chelsea, Somerville, and Everett contracts, account Mystic Water Works .	24,409 83	
Amount refunded Cochituate Water Works, for Cochituate water furnished East Boston, account Mystic Water Works . . .	19,172 70	
Amount refunded Main Pipe Assessment, account Cochituate Water Works .	50 00	
Construction, Additional Supply of Water . . .	213,350 97	
Construction, Mystic Sewer .	2,027 28	
Surplus Income of Cochituate Water Works to Cochituate Water Sinking Fund .	214,707 24	
Income of Additional Supply of Water to Cochituate Water Sinking Fund .	3,048 99	
Surplus Income of Mystic Water Works to Mystic Water Sinking Fund .	52,998 06	
Income of Mystic Sewer to Mystic Water Sinking Fund,	1,457 37	
Chestnut-Hill Driveway .	2,999 76	
Balance of appropriation Chestnut-Hill Driveway carried into the Treasury April 30, 1880 . .	24	
		1,634,018 89
		$293,308 32

April 30, 1880, Balance of loans unexpended, Additional Supply of Water .	$195,847 67	
Mystic Sewer . . .	21,754 36	
Stock on hand April 30, 1880, Cochituate Water Works .	61,159 24	
Mystic Water Works . .	14,547 05	
		$293,308 32

Total Water Debt of the City of Boston.

Cochituate, outstanding April 30, 1880 . .	$11,697,273 98	
Mystic, outstanding April 30, 1880 . . .	1,153,000 00	
		$12,850,273 98

Cochituate Water Debt.

Outstanding, April 30, 1879	$11,753,273 98	
Issued in 1879–80 . .	630,000 00	
	$12,383,273 98	
Paid in 1879–80 . .	686,000 00	
		$11,697,273 98

Mystic Water Debt.

Outstanding, April 30, 1879	$1,153,000 00	
Paid in 1879–80 . .	0,000,000 00	
		$1,153,000 00

Total Water Sinking Funds, April 30, 1880.

Cochituate Water Sinking Fund	$1,771,692 62	
Mystic Water Sinking Fund	318,137 06	
		$2,089,829 68

Trial Balance, Cochituate Water Works, April 30, 1880.

	Dr.	*Cr.*
Construction account	$16,341,908 25	
Cochituate Water Works		$16,341,908 25
City Treasurer, Loan account	689,198 64	
Income of Additional Supply of Water		3,048 99
Appropriation, Additional Supply of Water		195,847 67
Appropriation, New Main, Cochituate Water Works		280,000 00
Income of Cochituate Water Works		1,202,012 70
Maintenance of Cochituate Water Works	171,160 80	
Extension of Cochituate Water Works	67,884 25	
Interest on Cochituate Water Loans	643,037 93	
Mystic Water Works, East Boston Contract	44,013 24	
Refunded Pipe Assessments	50 00	
Stock Account	61,159 24	
City Treasurer, Revenue Account	1,112,537 67	
Appropriation, Chestnut-Hill Driveway		24
City Treasurer, Appropriation Account	3,000 00	
City Treasurer		1,111,132 17
Funded Debt	11,697,273 98	
Cochituate Water, 6% Currency Loan		4,967,000 00
Cochituate Water, 5% Currency Loan		13,000 00
Cochituate Water, 5% Gold Loan		3,552,000 00
Cochituate Water, 5% Sterling Loan		1,947,273 98
Cochituate Water, 4% Currency Loan		588,000 00
Cochituate Water, 4% Loan		362,000 00
Cochituate Water, 4½% Loan		268,000 00
Amounts carried forward,	$30,831,224 00	$30,831,224 00

Amounts brought forward,	$30,831,224 00	$30,831,224 00
Commissioners on the Sinking Funds	1,771,692 62	
Cochituate Water, Sinking Fund		1,771,692 62
	$32,602,916 62	$32,602,916 62

Trial Balance, Mystic Water Works, April 30, 1880.

	Dr.	*Cr.*
Construction	$1,614,648 10	
Mystic Water Works		$1,614,648 10
City Treasurer, Revenue Account	266,316 66	
Income of Mystic Water Works		272,774 92
Maintenance of Mystic Water Works	96,079 36	
Extension of Mystic Water Works	1,702 92	
Interest on Mystic Water Loans	63,865 00	
Chelsea, Somerville, and Everett Contracts	24,409 83	
Cochituate Water Works	19,172 70	
Stock	14,547 05	
City Treasurer, Loan Account	23,781 64	
Appropriation, Mystic Sewer		21,754 36
Income of Mystic Sewer		1,457 37
City Treasurer		213,888 51
Funded Mystic Water Debt	1,153,000 00	
Mystic Water 6% Currency Loan		613,000 00
Mystic Water 5% Currency Loan		410,000 00
Mystic Sewer 6% Currency Loan		130,000 00
Commissioners on the Sinking Funds	318,137 06	
Mystic Water Sinking Fund		318,137 06
	$3,595,660 32	$3,595,660 32

Cost of Construction of the Cochituate Water Works to May 1, 1880.

Cost of Water Works to January 1, 1850, as per final report of Water Commissioners	$3,998,051 83
Extension to East Boston	281,065 44
Jamaica-pond aqueduct	13,237 50
New dam at Lake Cochituate	10,940 08
Raising lake two feet, including damages	28,002 18
Dudley pond, lower dam, and making connections with lake	18,982 23
New main from Brookline reservoir	304,991 83
Land and water rights and land-damages since January 1, 1850	49,486 17
New pipe-yard and repair-shop	25,666 51
Upper yard, buildings, etc.	9,165 63
New water-pipes, East Boston	20,999 43
New main, East Boston	24,878 08
Pumping-works at Lake Cochituate	15,000 00
High-service, stand-pipe, engine-house and engines	103,829 53
High-service, South Boston	27,860 29
Chestnut-Hill reservoir, including land	2,449,982 07
Parker-Hill reservoir	228,246 17
Charles-river siphon	26,532 35
Keeper's house, Parker Hill	2,764 90
Temporary high-service, Brighton	7,865 86
New stable at Chestnut-Hill reservoir	8,103 55
Pegan dam, Natick	1,394 06
Willow dam, Natick	1,567 29
Additional supply of water, including land damages and all expenses	5,215,337 43
Cost of laying main pipe since January 1, 1850	1,709,445 62
Cost of laying main pipe for extension in Roxbury, Dorchester, Brighton, and West Roxbury Districts	1,758,512 22
	$16,341,908 25

Cost of Construction of the Mystic Water Works to May 1, 1880.

Salaries	$17,644 61
Engineering	33,746 87
Land-damages	91,855 38
Reservoir	141,856 26
Dam	17,167 26
Conduit	129,714 30
Engine-house, coal-shed, and chimney	36,112 99
Engines	150,096 70
Grubbing pond	9,393 26
Iron pipes	108,437 10
Iron pipes, trenching	61,029 59
City distribution	162,335 23
Hydrants	19,976 21
Stopcocks	19,262 52
Miscellaneous items	14,012 51
Roadway and bridge	3,529 22
Lowering Mystic river	3,012 06
Inspections	1,824 79
Service pipes and meters	133,858 70
Hydrants for Somerville and Medford	2,653 08
Somerville distribution	2,492 10
Dwelling-house for engineer and fireman (pumping-station)	4,871 02
Chelsea extension	37,347 86
Medford extension	3,997 41
Drinking fountains	1,415 05
New line of supply main	203,050 09
Stable and pipe-yard	8,964 64
Extension of engine-house and boiler	33,727 43
New force main	9,875 17
Mystic sewer	108,245 64
New stable, engine-house	1,767 39
Additional force main	24,882 96
Main pipe laying since 1873	16,492 70
	$1,614,648 10

Respectfully submitted,

W. E. SWAN,

Clerk of the Boston Water Board.

REPORT OF THE CITY ENGINEER.

OFFICE OF CITY ENGINEER,
CITY HALL, BOSTON,
May 1, 1880.

L. R. CUTTER, *Chairman Boston Water Board:* —

SIR, — In accordance with the requirements of the ordinance establishing the Boston Water Board, I respectfully submit the following report on the condition of the Water Works. Owing to the pressure of business I have been unable to forward it as early as requested.

COCHITUATE WORKS.

SUDBURY RIVER AND LAKE COCHITUATE.

In 1879 the water from the additional supply which until then had been taken directly from Sudbury river below the dam, was for the first time taken mostly from the storage reservoirs.

Reservoir No. 3, on Stony brook, which had been filled for the first time in December, 1878, remained full or nearly so until July, when it commenced to go down and continued to do so until the middle of August; a heavy rain at that time brought its surface to elevation 172.95. It went down again after that time until September 20th, when the reservoir filled gradually and commenced to overflow on December 26th, and the waste has continued without interruption to date.

Reservoir No. 2, owing to the delay in the construction of its dam, remained empty until August, when copious rains filled it almost to overflowing; it was heavily drawn from during the summer and went down in December to elevation 156.50. It was refilled in the fall and has remained full to date.

Reservoir No. 1, kept full in the beginning of the year, then emptied in April to allow the work to proceed at Dam No. 2, was refilled in December, and has been kept so since.

Although the spring rains have not been so abundant as in other years, the overflow from the three dams has been very large all the winter and spring.

During the year 1879, 3,749,200,000 gallons of water have been supplied to the city from the Sudbury river. This amount is equivalent to a daily supply of 10,271,800 gallons for the whole year. Of the above amount 411,300,000 gallons were diverted to Lake Cochituate and 3,337,900,000 gallons sent to Chestnut-Hill reservoir. The table on page 49 gives the monthly quantities diverted from the river to Lake Cochituate and Chestnut-Hill reservoir since 1872.

Lake Cochituate was 16 inches below high-water mark, or 133 feet above tide marsh level, on the first day of January, 1879. Until the first of September the surface was kept within 3 feet of high-water; Oct. 1st it had fallen to 129.54; Nov. 1st to 127.43; Dec. 1st to 126.60; Dec. 29th to 126.41, — the lowest point reached during the year. Since Jan. 1st, 1880, the lake surface has risen, standing Feb. 1st, 129.28; March 1st, 132.00; April 1st, 132.88; and May 1st, 134.10, or 3 inches below high-water mark.

Water has been wasted at the outlet dam from Feb. 28th to March 13th, March 18th to April 28th, and from May 2d to 8th (1879), the total waste being 1,523,361,400 gallons, equal to a daily supply of 4,173,600 gallons for the year.

During the months of November and December, 1879, two dams were built at the lake, to retain, at or near high-water mark, the water on the meadows of Course, Beaver-dam, and Pegan brooks.

The dam for the meadows of Course and Beaver-dam brooks is situated at the culvert under the Central turnpike. It is semi-circular in plan, and consists of a centre of 6-inch tongued and grooved sheet-piling driven on a circle of 30 feet radius, backed with gravel filling, having a slope of 2 to 1 and faced with stone filling which is paved on the surface.

A sluice 6½ feet in width is built through the dam and is provided with stop-planks for retaining the water at any desired height. The dam for the Pegan-brook meadows was built on the site of a former dam. The old dam was raised and improved by the addition of a paved overflow 34 feet in length and of a sluice-way 6 feet in width, the latter for the purpose of regulating the depth of the water on the meadows. The filter dams, on Pegan brook, have been repaired and both basins thoroughly cleaned.

High-Service Reservoir and Pumps.

The average height of the water in Parker-Hill reservoir has been 217.85 feet above tide marsh level, or .49 feet higher than in 1878.

The table on page 56 shows the work done by the pumping-engine during the year 1879. Practically all the pumping has been done by the Worthington engine and the economy of this plan is shown by the cost of pumping given below.

Total quantity of water pumped, 820,827,210 gallons.

Total coal consumed, 1,510,500 lbs., of which 13.4 per cent. were ashes and clinkers.

Average lift, 114.8 feet.

Quantity pumped per pound of coal, 543.4 gallons.

Average duty 52,057,100 ft. lbs. per 100 lbs. of coal (without deductions for ashes and clinkers).

The average daily quantity pumped was 2,248,840 gallons, an increase of 9 per cent. over that of 1878.

Cost of Pumping.

Salaries	$3,840 88
Fuel	3,474 25
Repairs	69 62
Oil, waste, and packing	169 78
Gas and small supplies	292 52
Total	$7,847 05

The cost of pumping 1,000,000 gallons one foot high in each year since the works have been in operation has been as follows: —

1871 . . $0.37	1874 . . $0.244	1877 . . $0.137
1872 . . 0.34	1875 . . 0.22	1878 . . 0.122
1873 . . 0.283	1876 . . 0.18	1879 . . 0.083

Brighton High-Service.

The daily average quantity pumped at this station has varied from 25,000 to 200,000 gallons.

This variation is caused by the large amount used during the summer season for watering streets and lawns.

The Brighton high-service being of a temporary nature, it was not deemed advisable, at the time of construction, to purchase land for a reservoir; the present one was located in the grounds of the High-School house in Rockland street, which are not as high as could be wished. Since the works have been in operation it has been found desirable to increase the pressure in the distributing pipes and this result has been successfully obtained at a small cost by the introduction

of a check-valve, with a safety-valve by-pass on the force main just outside of the reservoir.

When the pumps are in motion the check-valve remains closed, and the surplus water not used by the consumers flows through the by-pass into the reservoir and the pressure in the mains is kept above the reservoir head. When the pumps are stopped, or when from any cause the draught upon the mains is in excess of the pumping capacity, the pressure falls, the check-valve opens, and the distributing pipes are supplied from the reservoir.

With this arrangement an increased head of 46 feet above that due to the height of the reservoir has been maintained during the day hours since Sept. 1. The pumps and boilers are in good condition.

MYSTIC WORKS.

Mystic Lake.

From the beginning of the year until the middle of June the water in the lake remained near high-water mark.

August 1st it had fallen to 3.75 feet above tide-marsh level; August 18th, 2.56; Sept. 1st it had risen to 4.04; Oct. 1st it stood at 3.50; Nov. 1st, 1.51; Dec. 1st, 0.82; Dec. 5th at 0.75,—the lowest point reached since the winter of 1874–75. From this date the lake surface rose until the 25th of Jan., when it reached high-water mark, and commenced to overflow at the outlet dam.

During the year 3,735,800,000 gallons have been wasted at the outlet dam, equivalent to an average daily supply of 10,235,000 gallons for the entire year.

In October the conduit was examined and a large quantity of vegetable growth and fresh-water mussels was removed from the upper portion. No new cracks were discovered in the masonry.

During the year the grounds near the entrances to the dam have been much improved by grading and by the planting of shade and ornamental trees. The bridge over the outlet dam has been entirely rebuilt.

Mystic–Valley Sewer.

Four tanneries have been connected with the sewer during the year, necessitating the construction of as many catch-basins.

All the tanneries and dwellings within reach of the sewer,

which formerly discharged their refuse into the streams or ponds of the Mystic supply, now discharge into the sewer. The catch-basins and branch drains have been cleaned and flushed when required.

MYSTIC PUMPING-STATION AND RESERVOIR.

The table on page 57 shows the work done by the engines at this station during the year.

Engine No. 1 was in use 1,729 hours 15 minutes.
" " 2 " " 3,212 " 34 "
" " 3 " " 7,436 " 17 "

Total amount pumped, 3,242,848,221 gallons.

Total coal consumed, 5,884,516 lbs., of which 7.5 per cent. were ashes and clinkers.

Average lift, 149.36 feet.

Quantity pumped per pound of coal, 418.8 gallons, an increase of 23.2 gallons over the amount for 1878.

Average duty of the three engines, 52,175,700 ft. lbs. per 100 lbs. of coal. (No deductions.)

Evaporation in the boilers from and at 212°, as determined by measurement of the water, 10.07 lbs. of water per lb. of coal.

COST OF PUMPING.

Salaries	$6,920 50
Fuel	17,366 09
Repairs	453 24
Oil, waste, and packing	901 09
Small supplies	105 62
Total	$25,746 54

Cost per million gallons raised one foot high, $0.053.

The pumps have required no extensive repairs during the year, and are now in good condition.

A large number of shade and ornamental trees have been planted on the engine-house grounds.

At the reservoir changes have been made in the location of the roadway and in the grading of the slopes. A 24-inch connection has been made outside of the gate-house, between two of the supply-mains, to facilitate the making of repairs or examinations in the gate-house in case they should be required.

Pipes and Pipe Plans.

The capacity of the mains bringing the supply from Brookline reservoir to the city has not been increased since the year 1859. Since that time the consumption from the Cochituate works has increased from 13,175,000 to 25,695,000 gallons or nearly 100 per cent. The effect of this large increase has been to greatly diminish the head or pressure in the city. Observations made during the past year show that, during the time of greatest consumption, the loss of head is from 32 to 34 feet.

In view of increasing the supply, and thus preventing this excessive loss of head, surveys and estimates were made for a new 48-inch main from Chestnut-Hill reservoir to the city. The new main having been authorized by the City Council, contracts have been made for the pipes and it is expected that the line will be completed during the present season. During the year the Cochituate distribution has been extended by the laying of about 8 miles of pipe.

In the Charlestown District about 17,200 ft. of the wrought-iron and cement pipe have been replaced by cast-iron and in most cases the sizes of the pipes have been increased. The plans showing the pipe system have had the year's extensions added as usual, and plans of Brighton, on a scale of 100 feet to an inch, have been completed, so that now the entire city is shown on that scale. A large plan has also been made, showing the entire high-service distribution system.

Quality.

The quality of the Cochituate water has been good throughout the year. The Sudbury river water has been somewhat colored and, at times, has had a slightly bitter taste which was noticed in the city late in the fall, when the river water was sent directly into the distribution pipes without passing through Chestnut-Hill reservoir.

The rest of the time, the Cochituate and Sudbury river waters were mixed in the proportions shown in the accompanying diagram and table.

In the early part of September an abundant growth of algæ developed itself in Reservoir No. 3 of the Sudbury-river works. The reservoir was immediately isolated from the rest of the supply, and, owing probably to that precaution, the *algæ* did not show themselves except in small quantity in Basin No. 1, Farm Pond, and Chestnut-Hill reservoir. The presence of the algæ in Reservoir No. 3 was

observed until the beginning of December, when, the water having resumed its former quality, it was drawn as usual for the supply of the city. The plants observed were extremely minute, but grew in such quantities as to fill the water to which they gave a mealy appearance; the portions near the surface of the water were often gathered together, by the action of the wind, into green patches, which were blown towards the lee shore. These microscopic algæ were of two kinds, one having a somewhat globular form, the other presenting the appearance of a curved string of beads. The quantities observed were constantly varying, increasing sometimes with wonderful rapidity. The cause of this growth is not known, and, with the present knowledge of these matters, no remedy can be applied; the formation of the *algæ* seems to be wholly independent of the depth of the water, but closely follows the changes of temperature, increasing when it rises, and diminishing when it lowers.

The *algæ* were not observed in Reservoir No. 2, which is not as deep as Reservoir No. 3.

The experience of the past year shows the value of the independent connections of the reservoirs of the Sudbury-river supply, without which it would have been impossible to prevent the contaminated water from reaching the distributing pipes of the city, to the great inconvenience of the water-takers.

In July another *alga*, the *Clathrocystis*, similar to one of those observed in Reservoir No. 3, made its appearance in large quantities in the water of Horn pond, from which it found its way into Mystic pond and thence into the distributing pipes; being very minute, it could not be stopped by screens. It is somewhat remarkable that it should originate in the deep water of Horn pond, yet could not be found in the Abbajona river above the outlet of its tributary from this pond. The complaints about the quality of water became so numerous that, in the middle of August, the City Government instructed your Board to consider and report upon the expediency and cost of introducing a system of filtration in connection with the Mystic water supply. My predecessor, at your request, investigated the subject, and, in his report to your Board,[1] made in November, came to the conclusion that the only practicable mode of filtering the whole of Mystic supply is by means of artificial filtering beds; it would require a very extensive filtering area, and the estimate of cost of such a scheme is $427,000, which would be

1 The report is given in full in the Appendix.

increased to $507,000 if it was found necessary to cover the filter beds; this expenditure was not recommended.

I would call the attention of your Board to the following extract of Mr. Davis' report upon the filtration of the Mystic water: "If vegetable growth shall prove as troublesome in the future as it has been in the past few years, some steps, such as by filtration, by connection with the Cochituate works, by seeking a new source, or by employing temporary expedients, must be taken."

Your Board has already had under consideration one of the above suggestions, — that of connecting the Mystic works by an independent pipe with Chestnut-Hill reservoir. Should the growth of *algæ* develop itself again in the Mystic supply, this costly scheme would be looked upon more favorably if the pipe was to be partly used for furnishing a supply of water to the city of Cambridge which has already manifested its intention of entering into negotiations with the city of Boston for that purpose.

In November the *algæ* disappeared from Mystic lake and the water resumed its ordinary condition.

In the Appendix may be found a report, kindly furnished by Prof. W. R. Nichols of the Massachusetts Institute of Technology, which gives the results of his analysis of the water supplied to the city.

Additional Supply, Sudbury River.

The amount expended to date for the additional supply is $5,217,039.13.

The total sum appropriated for the construction of the additional supply is . .	$5,412,886 80
Amount expended to date	5,217,039 13
Leaving a balance of	$195,847 67

Of the amount expended, $3,728,530.54 have been spent for work done and materials furnished, including the construction and maintenance of the temporary connection. $1,488,601.93 have been spent for preliminary surveys, for investigations into various sources of supply, for land and water damages, for engineering, superintendence, and other expenses.

It has always been considered of the utmost importance for the purity of the additional supply to divert the surface drainage of South Framingham from Farm pond, and an allowance was made in the original estimate of cost for

the probable expense of whatever share of the work the city might have to do for the purpose of securing in this manner the purity of the supply. A plan has been studied for a sewer along the eastern shore of Farm pond to the Sudbury river. Its construction has, however, been delayed by various circumstances over which this department has had no control; but it is to be hoped that either some method will be devised for stopping this objectionable drainage from being discharged into the pond, or some arrangement can be made by which this structure may be speedily constructed. With this exception, and that of some work of minor importance which remains to be done, the construction of the additional supply as contemplated in the original estimates, with three reservoirs, may be considered as completed; and, in due time, a special report on the subject is to be submitted to your Board.

During the year Dam No. 2 has been finished, and the two highways ordered by the County Commissioners of Middlesex, between Framingham and Ashland, have been completed. The three reservoirs and Farm pond have been put in complete working order, and the supply has been drawn from them for a portion of the year. All the gate-houses connected with the dam have also been finished and fitted for work. For the year ending Dec. 31st, 1879, the average record of rainfall at five points in the Sudbury-river water-shed (Hopkinton, Westborough, Marlborough, Southborough and Framingham), is 41.419 inches, of which 45.33% found its way into the river. The total yield of the water-shed was 25,528,900,000 gallons, equivalent to a depth of 18.775 inches over the whole drainage area, or to a daily flow of nearly 70,000,000 gallons.

By comparison with the preceding years (page 51) it may be seen that 1879 has been a dry year; and, had it not been for an abundant rain in August, the reservoirs would have been very low at the end of the season.

Condition of the Water Works.

All the works are, in most respects, in a satisfactory condition. The Cochituate conduit has some weak points which it would be well to strengthen. This structure has been taxed beyond its capacity for years, and, as the flow of water through it could not be stopped for any length of time, no thorough repairs have been made. With the new supply in operation the conditions are somewhat different, and some steps ought to be taken to put the conduit in perfect condition. An attempt was made last fall to repair it at a point

near Lake Cochituate, where the invert is known to require strengthening; but the pressure of the water could not be sufficiently overcome to do efficient work.

The flow of the water through the two conduits ought to be so arranged that some needed repairs can be commenced and prosecuted systematically without interfering with the continuous supply of the city. Some portions of the Cochituate conduit near the lake, where it is built at a great depth, in ground saturated with water, will be difficult to reach, and the repairs will be costly.

The attention of your Board must be called also to the necessity of taking some measures for the improvement of the outlet of Lake Cochituate.

In 1857 the City Engineer (see Report of Water Board and of City Engineer, January, 1857) reported signs of weakness in the dam at the outlet of the lake. At his recommendation a second dam was built 460 feet below the original one, and the overflowing capacity of the latter was somewhat increased by widening its channel.

Notwithstanding this alteration the capacity of the dam for the overflow of surplus water is not sufficient, and it has been necessary to regulate with great care the filling of the lake in the spring. This condition of things may have been satisfactory in years past, but cannot be allowed to continue. The general conditions of the water supply are changed. Lake Cochituate has become one of the storage reservoirs for the water of Sudbury river, and, with the increased consumption of water, it becomes necessary to keep Lake Cochituate as full as it is deemed prudent. Every spring those in charge find themselves compelled either to keep the surface of the lake low, necessitating the loss of a large storage capacity, in order to leave room for possible freshets, or to fill the lake at considerable risk in case an abundant rainfall should occur.

An investigation of this subject, recently made by the Superintendent of the Western Division, under the direction of my predecessor, confirms me in the opinion that some early action must be taken in this matter.

Consumption of Water.

The average daily consumption has been, for the year 1879, as follows: —

From Mystic lake	8,883,470 gall.
" Lake Cochituate and Sudbury river .	25,695,900 "
Total	34,579,370 "

An increase of 9 per cent. over the consumption of 1878.

On page 50 can be seen the comparative daily consumption from the Cochituate and Mystic works from 1873 to 1879, inclusive.

On page 49 are shown the quantities of water diverted from Sudbury river.

The accompanying diagrams, relating to the same subject, explain themselves.

These tables and diagrams show a large increase in the consumption of water, chiefly from the Cochituate and Sudbury supply, which has been drawn from to the amount of 10.7 per cent. in excess of the consumption of the previous year. At this rate of increase the limit of the present supply would soon be reached. Its maximum capacity in case of a dry year is shown by the following figures: —

Minimum daily yield of Lake Cochituate in a dry year		12,000,000 galls.
Intended daily yield of the three reservoirs on Sudbury river		20,000,000 "
		32,000,000 "
Deduct 1½ million gallons, which the city must let run in the Sudbury river below its dams		1,500,000 "
Total daily supply available in a dry year,		30,500,000 "
Average daily consumption during the months of July, August, September, October, and November, 1879	26,850,000 galls.	
Amount to be probably furnished to East Boston	2,500,000 "	
		29,350,000 "
Excess of daily supply over consumption in a dry year		1,150,000 "

If the waste of water is not stopped, it is clear that, in case of a dry season, the present supply would soon fall short of the wants of the city, and, as two years, if not more, would be necessary to build more reservoirs and have them in readiness to supplement the supply, I believe it advisable to take action towards securing the necessary lands for building at least one of the storage reservoirs contemplated

in the valley of the Sudbury river or of its affluents. I have not at present sufficient data to make an exact estimate of the cost of the additional reservoirs contemplated on the Sudbury river, but the difference between the actual cost of the whole works, as now constructed, and the original estimate, would be more than sufficient to build one of them.

In no part of the supply is the increase of consumption more noticeable than in the high-service. It is forcibly illustrated in one of the accompanying diagrams.

The daily average quantities of water pumped at the Highland Pumping Station since 1871 have been as follows: —

	Gallons.	Yearly percentage of increase.
1871	557,650	
1872	633,500	13.6
1873	1,023,350	61.5
1874	1,260,700	23.2
1875	1,269,910	.7
1876	1,461,100	15.
1877	1,718,000	17.5
1878	2,063,460	20.1
1879	2,248,840	9.

No increase in area of territory supplied has been made since 1875, when the supply was extended to West Roxbury, and the yearly increase in consumption since that time has been about 15 per cent.

Assuming a yearly increase of 12 per cent. for the future, the consumption will be as follows: —

1880	2,520,000 gallons.
1881	2,820,000 "
1882	3,160,000 "
1883	3,540,000 "
1884	3,963,000 "

In the winter the daily average would sometimes be higher, and, judging from present experience, it must be expected that the daily average for January, 1883, will attain 4,000,000 gallons.

The figures given above are averages and would often be exceeded for weeks at a time when the demand upon the high-service is at its maximum.

Such a service as will be required within a short time is beyond the safe pumping capacity of the present machinery. A special report on the subject (City Document No. 117, 1875) by the City Engineer to the Water Board, presented

all the facts necessary to show that prompt action ought to be taken in the matter. Since then, by the erection of the Worthington 3,000,000 gallon pumping-engine, and by the construction of the Brighton high-service works, a temporary relief has been experienced; but, considering that legislative authority must be obtained, and that at least two years, are necessary for the construction of a permanent system of high-service works, it is evident, unless there is immediate action taken, that the new high-service works, as recommended by the Cochituate Water Board in 1875, cannot be completed before the safe capacity of the present works is exceeded.

In this connection I would call your attention to the following extract from the report of the Cochituate Water Board to the City Council, dated December 2, 1875, as being especially applicable at present: —

"In submitting the accompanying report of the City Engineer upon a new high-service system of water supply . . . . . the Cochituate Water Board desires to express the following opinions: —

"*First.* That, owing to the recent annexation of West Roxbury and Brighton with their large areas of high lands, the constant extension of the high-service in the older divisions of the city, and the increase of consumption that will result from increase of population in the districts now supplied, very largely increased facilities for furnishing the high-service supply will soon be imperatively demanded.

"*Second.* That, for reasons stated in the engineer's report, the present site of the pumping machinery should be abandoned when any large increase in the works is made.

"*Third.* That a plan of new works should be adopted at an early day, and that, if the City Council concur in this opinion of the Board, the Legislature should be petitioned at its next session for the needful authority to build it.

"*Fourth.* That the plan proposed and recommended by the engineer — that of pumping machinery located at Chestnut Hill reservoir, with three distributing reservoirs and large connecting mains — is the one that should be adopted."

It must be remembered that when the high-service works were constructed in 1869 they were intended for the supply of the high lands of the Roxbury District only; since that time, by the annexation of Dorchester, West Roxbury, and Brighton, and the extension of the works to Beacon Hill and South Boston, the area included in the high-service districts has been increased from 760 to about 10,720 acres.

The consumption is also increased by constant and grow-

ing demands for the extension of the high-service into districts now supplied by the low-service.

The consumption of water from the Mystic works is also increasing, and the experience of several seasons, especially in 1874 and 1879, when the surface of the lake receded to an uncommonly low level, shows that steps must be taken to increase in the dry season the supply furnished by that source. The average daily consumption for the whole year does not give an exact idea of the extent to which the source of the supply is taxed, as the maximum consumption generally takes place in the dryest portion of the year when the supply depends mainly on the storage capacity of the lake. Owing to the irregularities of the daily consumption the limit of the safe pumping capacity of the works has already been reached. The distributing reservoir contains only two days' supply, and if the 8,000,000 gallon engine should be temporarily disabled at a time when the daily consumption reaches 13,000,000 gallons, the remaining engines would barely maintain the supply, even if, as intended, East Boston is connected with the Cochituate service.

In closing I wish to call your attention to the tables and diagrams, which are appended, showing the consumption of water, rainfall, etc., for the year 1879, and desire also to express my obligations to my chief assistant, Mr. Fteley, for his efficient aid in the compilation and preparation of this report.

Respectfully submitted,

HENRY M. WIGHTMAN,
City Engineer.

APPENDIX.

REPORT OF J. P. DAVIS TO THE WATER BOARD ON THE FILTRATION OF MYSTIC WATER.

Boston, December 1, 1879.

L. R. Cutter, Esq., *Chairman Boston Water Board:* —

Sir, — The order of the City Council requesting the Water Board to consider and report upon the cost and expediency of filtering the Mystic water supply, was referred to me by vote of your board on August 27. Since that date Mr. Fteley, resident engineer of the Sudbury-river supply, has, by my direction, made such surveys and experiments having a bearing on the subject as the time at his disposal would permit.

The investigations have not covered all the ground which it is, perhaps, desirable to cover, but regarding it as important to give you a report in season for its transmittal to the present City Government, I respectfully submit the following: —

The Cost.

Experiments were made to ascertain the nature of the substrata in the vicinity of Mystic lake, and whether it would be practicable to obtain a sufficient supply of water by filtration through them.

Material which was sufficiently porous to yield a large supply was found at a depth too great to admit of building a filtering gallery, but which could be reached and drawn from by wells of from twenty to thirty feet in depth. This stratum consists of fine gravel and yields a large supply of water, — part of which comes from the lake and part from the surrounding territory, — at least the effect of pumping and chemical analysis of the water point to these as the sources.

The area of the subterranean source is not of sufficient extent to yield a large continuous supply, and experiments made with artificial filters show that when the water is filled with the *algæ*, which have been so troublesome during the past summer, the filtering surface becomes quickly clogged and almost impervious, thus making it quite probable that the supply from the lake at such times would be soon cut off and the yield of the gravel stratum reduced far below the present consumption from the Mystic works.

Other methods of filtering have been considered, but none of them except the ordinary one — that of passing the water through prepared beds of sand so arranged as to be readily accessible for

cleaning — promise to be successful in providing a sufficient supply of thoroughly filtered water.

The estimated cost is, therefore, for artificial filters constructed on the European plan and consisting of two feet of fine sand, one foot of coarse sand, one foot of fine gravel, and three feet of coarse material placed in layers in masonry reservoirs or tanks. To filter 10,000,000 gallons daily and to provide a surplus area that the process of cleaning may be carried on without interruption to the supply, seven beds, each having an area of about 33,000 square feet, will be required, — allowing an average flow of fifty gallons per square foot per day.

The relative levels of the lake surface and the existing conduit are such that pumps will be required to lift the water from the lake to the filters, which last will deliver the filtered water to the conduit by gravitation, and are to be situated near the gate-house at the upper end of the conduit, where good sand and gravel for forming the beds are found.

The estimated cost is as follows: —

Inlet chamber and pumping station	$120,000
Filters, tracks, washing beds, etc.	250,000
	$370,000
Add ten per cent. for superintendence and contingencies	37,000
	$407,000
Land-damages, say	20,000
	$427,000

The cost of pumping and of operating the filters would be about five dollars per million gallons of filtered water.

The interest upon cost of works at five per cent. would be nearly six dollars per million gallons, making the total cost eleven dollars.

Expediency.

Two kinds of pollution have been complained of, — sewage and vegetable growth. Since the construction of the Mystic Valley sewer most of the former has been diverted from the lake, and it is expected that in a short time all direct drainage into the lake or its tributaries of refuse matter from dwellings, tanneries, and manufactories will be stopped. There will always remain, of course, the washings from the streets and land surfaces, which are objectionable, and especially so when coming from a thickly-settled territory.

Filtration carefully conducted will remove matters held in suspension, but has very little effect upon the matters in solution. Some experiments and observations that have been made upon filtration through sand show that a slight proportion of the matters in solution is removed (probably by oxidation), but not enough to render the process, in this respect, of much value.

Unfortunately, much of that which is dangerous to health in sewage is in solution; hence the filtration of water thus polluted fails to restore its salubrity.

During the past summer, and in that of 1876, the Mystic water was rendered unfit for many domestic purposes by the presence of immense quantities of *algæ*, a low order of plants which multiply with marvellous rapidity, diffusing themselves throughout large bodies of water in a single day, apparently.

There is no evidence that these *algæ* are injurious to health, but when present in large numbers they give a disagreeable odor to the water and render its use extremely distasteful.

Experiments made by Mr. Fteley show that they may be completely removed from the water by careful filtration through sand; but the experience of Poughkeepsie, in this country, and of Berlin and other cities in Germany, shows that the filtering process does not arrest the spores of the plants; at least, in those cities vegetable growth has appeared anew in the filtered waters when stored.

There are special difficulties attending the filtration of water in a climate subject to extremes of temperature. In the winter the water on the filter beds freezes, and thick bodies of ice often form, which require to be removed at a considerable cost when cleaning or repair of the filtering surfaces is needed.

In the summer the hot sun acts upon the sand-beds through a shallow stratum of water, heating the water, and thus rendering it possible for plants to grow upon the surface of the filters. This growth seriously interferes with the action of the filters and necessitates frequent cleaning.

Both of these troubles may be obviated by covering the beds by arches or roofs, and it is probable that the growth of *algæ* in the *filtered* water may be prevented by covering the clear water reservoir.

No estimate has been made of the cost of covering the reservoirs, but an approximate estimate, amounting to $80,000, has been made of the cost of building substantial sheds over the filters.

An important matter which must be considered in discussing the question of expediency is that of *waste of water*.

In my last annual report I showed that about one-half the water supplied to the city was wasted; now it is obvious that filtration is too expensive an operation to apply to water which is to serve no useful purpose, but which is simply to be thrown away.

If the consumption can be reduced to proper limits, and I know of no sound reason why it should not be, then filtration of the entire supply can be resorted to without throwing a serious burden upon the city. It may be well to say here, that already the consumption of the Mystic water exceeds the quantity which its source, with its present storage capacity, can furnish in a season of great drought (see City Doc. No. 85, page 14, 1874), and that the present condition of the lake gives warning that either active measures must be taken to reduce the consumption, or large expenditures must be at once made to increase the supply.

East Boston has been supplied from the Cochituate works for the past four months. Had it been connected with the Mystic works

during that time, Mystic lake would have been practically exhausted some days ago.

From what precedes it will be seen that filtration is only a partial remedy for pollution by sewage; that when carefully conducted it is a sufficient remedy for pollution by vegetable growth; and that it is an expensive process, but that its cost may be brought within reasonable limits if waste of water is first prevented.

If the vegetable growth shall prove as troublesome in the future as it has in the past few years, then, beyond doubt, some step, such as by filtration, by connecting with the Cochituate works, by seeking a new source, or by employing temporary expedients, must be taken to furnish the consumers of the Mystic water with a purer supply; but I am of the opinion that it is inexpedient to build filters at the present time.

JOSEPH P. DAVIS,
City Engineer.

REPORT OF PROF. W. R. NICHOLS TO THE CITY ENGINEER.

To H. M. Wightman, Esq., *City Engineer:* —

Dear Sir, — I submit herewith in tabular form the results of such chemical examinations of Cochituate and Mystic water as have been made in my laboratory during the past year. The analytical work has been performed under my direction by Mr. W. W. Macfarlane, S.B., and I have full confidence in the accuracy of the results.

Cochituate Water.

The quality of the water delivered from the Cochituate works has been generally good. As in the case of all surface waters, a good filter will remove, at any time, more or less of animalcules and vegetable fragments, but there is no evidence that the presence of the small quantity of these foreign substances in the water actually used for drinking gives to it any unwholesome quality. During a portion of the year a very considerable amount of water has been contributed by the Sudbury-river works; and, as a result, at times the water as drawn in the city has been quite strongly colored. For a few days, during which, as I understood, experiments were being made on the flow of the water in the aqueduct, the water had rather a marked unpleasant taste, evidently due to the vegetable matter taken up in the storage basins. The beneficial effects of exposing a water of this character to the air, in an open conduit or by passing through a reservoir, are very marked.

Table I. contains the results of the examination of the water as drawn in the Laboratory of the Massachusetts Institute of Technology. The method employed is that known as Frankland's, some description of which was given in the last report of the Water Board. For the benefit of those to whom this method is yet unfamiliar, I may state that it consists in evaporating a certain quantity of the water to dryness, under suitable conditions, and subjecting the dry residue which remains to a process of organic analysis, in a closed vessel, in such a manner as to convert all the *carbon* and *nitrogen* of the organic matter into gaseous substances, which are collected and measured. The carbon and nitrogen are spoken of as *organic carbon* and *organic nitrogen* respectively, and they are sometimes taken together and spoken of as the *organic elements*. The method is difficult and tedious, requiring the use of expensive and frangible apparatus, and consuming considerable time; for these reasons it can never be popular. Moreover, as is the case with every method employed for obtaining indications of the amount and character of the organic matter in the water, the

results must be interpreted by a knowledge of the source from which the water is derived, and of its surroundings. It must be borne in mind, moreover, that the sum of the amounts of organic carbon and organic nitrogen does not represent the actual *amount of organic matter* present, for most organic substances which occur in natural waters contain in addition a larger or smaller amount of oxygen and of hydrogen; how much, in any particular case, we cannot tell. In interpreting the results it is felt that considerable importance attaches to the relative proportion of carbon to nitrogen, for it is, in general, true that organic matter of vegetable origin contains a larger proportion of carbon, while organic matter of animal origin contains a larger proportion of nitrogen.[1]

TABLE I. — *Examination of Boston Water.*

(Results expressed as so many parts by weight in 100,000 parts by weight of the water.)

Date.	Temperature in Centigrade Degrees.	Organic Carbon.	Organic Nitrogen.	Sum of the Organic Elements.	Ratio. $\frac{\text{Carbon}}{\text{Nitrogen}}$.
1879.					
June 26	. . . . .	0.386	0.022	0.408	17.5
July 2	. . . . .	0.377	0.026	0.403	14.5
" 9	. . . . .	0.376	0.030	0.406	12.5
" 23	22.1	0.384	0.048	0.432	8.0
" 31	23.2	0.339	0.029	0.368	11.7
Aug. 7	24.1	0.398	0.029	0.427	13.7
" 14	26.7	0.405	0.027	0.432	15.0
" 21	20.7	0.432	0.053	0.485	8.2
" 28	20.5	0.365	0.073	0.438	5.0
Sept. 4	20.3	0.401	0.063	0.464	6.4
" 11	20.1	0.436	0.042	0.478	10.4
" 18	19.5	0.443	0.072	0.515	6.1
" 25	17.9	0.444	0.069	0.513	6.4
Oct. 2	17.7	0.404	0.065	0.469	6.2
" 9	18.9	0.386	0.038	0.424	10.1
" 16	16.9	0.409	0.034	0.443	12.0
" 23	15.5	0.367	0.049	0.416	7.5
" 30	12.3	0.402	0.049	0.451	8.2
Nov. 21	8.8	0.407	0.062	0.469	6.6
Dec. 4	6.8	0.449	0.042	0.491	10.7
" 19	3.8	0.450	0.051	0.501	8.8

[1] For a fuller discussion of Frankland's method, see Report of Massachusetts State Board of Health, Lunacy and Charity, 1880. Department of Health, pp. 111, *et seq.*

TABLE I. — *Continued.*

Date.	Temperature in Centigrade Degrees.	Organic Carbon.	Organic Nitrogen.	Sum of the Organic Elements.	Ratio. Carbon / Nitrogen.
1880.					
Jan. 1	3.3	0.500	0.055	0.555	9.0
" 16	3.3	0.545	0.064	0.609	8.5
" 23	. . . . .	0.694	0.064	0.758	10.8
" 31	3.6	0.614	0.041	0.655	15.0
Feb. 5	2.9	0.659	0.061	0.720	10.8
" 9	4.0	0.668	0.072	0.740	9.3
" 12	. . . . .	0.723	0.063	0.786	11.5
" 19	3.0	0.592	0.051	0.643	11.6
" 25	3.1	0.526	0.064	0.590	8.2
Mar. 4	6.3	0.582	0.047	0.629	12.4
" 11	4.2	0.443	0.071	0.514	6.2
" 18	6.8	0.413	0.060	0.473	6.9
" 26	4.2	0.438	0.037	0.475	11.8
April 1	4.8	0.368	0.046	0.414	7.9
" 9	. . . . .	0.446	0.048	0.494	9.3
" 16	9.2	0.397	0.044	0.441	9.0
" 22	9.8	0.360	0.047	0.407	7.7
May 6	13.2	0.325	0.046	0.371	7.1
" 13	15.6	0.361	0.063	0.424	5.7
" 21	15.8	0.423	0.034	0.457	12.4
" 28	18.8	0.447	0.075	0.522	6.0
Mean of 42 samples	. . . . .	**0.452**	**0.051**	**0.503**	**8.9**

MYSTIC WATER.

The samples of Mystic water have been furnished me from the office in Charlestown. The results of the examination are presented in Table II., together with the record of the examination of samples taken from the Mystic pond itself during a portion of the year. These samples were taken two feet below the surface, at a point some distance from the shore where the water is usually about 75 feet deep.

TABLE II. — *Examination of Mystic Water.*

(Results expressed as so many parts by weight in 100,000 parts by weight of the water.)

Date.	Locality.	Organic Carbon.	Organic Nitrogen.	Sum of the Organic Elements.	Ratio. $\frac{\text{Carbon}}{\text{Nitrogen}}$.	Ammonia.	"Albuminoid Ammonia."	Total Solids.
1879.								
June 19 . .	Charlestown . .	0.390	0.083	0.473	4.7	. .	. .	. .
" 26 . .	" . .	0.395	0.088	0.483	4.5	. .	. .	. .
July 3 . .	" . .	0.445	0.056	0.501	7.9	. .	. .	9.6
" 10 . .	" . .	0.762	0.100	0.862	7.6	. .	. .	10.0
" 17 . .	" . .	0.716	0.112	0.828	6.4	. .	. .	10.2
" 24 . .	" . .	. .	. .	. .	. .	0.004	0.033	10.5
" 31 . .	" . .	0.782	0.126	0.908	6.2	0.005	0.037	10.8
Aug. 7 . .	" . .	0.727	0.082	0.809	8.9	0.004	0.033	. .
" 14 . .	" . .	0.483	0.065	0.548	7.4	0.004	0.024	10.2
" 21 . .	" . .	0.400	0.107	0.507	3.7	0.005	0.024	10.4
" 28 . .	" . .	0.455	0.100	0.555	4.5	0.005	0.023	10.7
Sept. 4 . .	" . .	. .	. .	. .	. .	0.003	0.019	9.8
" 11 . .	" . .	0.407	0.112	0.519	3.6	0.004	0.021	9.5
" 18 . .	" . .	0.330	0.081	0.411	4.1	0.002	0.020	9.7
" 25 . .	" . .	0.352	0.062	0.414	5.7	0.004	0.020	9.6
Oct. 2 . .	" . .	0.364	0.059	0.423	6.2	0.004	0.016	9.8
" 9 . .	" . .	0.328	0.022	0.350	14.5	0.007	0.016	10.1
" 16 . .	" . .	0.315	0.021	0.336	15.0	0.001	0.013	9.6
" 18 . .	Mystic Pond . .	. .	. .	. .	. .	*0.001*	*0.016*	*9.7*
" 23 . .	Charlestown . .	0.316	0.055	0.371	5.7	0.003	0.013	9.7
" 30 . .	" . .	0.323	0.063	0.386	5.1	0.003	0.013	. .
Nov. 7 . .	" . .	0.301	0.056	0.357	5.4	0.005	0.013	10.0
" 8 . .	Mystic Pond . .	*0.307*	*0.057*	*0.364*	*5.4*	*0.007*	*0.012*	*9.6*
" 15 . .	" . .	*0.401*	*0.043*	*0.444*	*9.3*	*0.008*	*0.013*	*9.5*
" 20 . .	Charlestown . .	0.374	0.056	0.430	6.6	0.005	0.009	9.4
" 22 . .	Mystic Pond . .	*0.306*	*0.036*	*0.342*	*8.5*	*0.013*	*0.013*	*9.7*
Dec. 4 . .	Charlestown . .	0.275	0.022	0.297	12.5	0.009	0.011	9.9
" 8 . .	Mystic Pond . .	*0.269*	*0.043*	*0.312*	*6.3*	*0.011*	*0.013*	*9.2*
1880.								
Jan. 1 . .	Charlestown . .	0.315	0.046	0.361	6.8	0.012	0.013	9.9
" 15 . .	" . .	0.313	0.054	0.367	5.8	0.012	0.011	10.2
" 30 . .	Mystic Pond . .	*0.335*	*0.043*	*0.378*	*7.8*	*0.053*	*0.019*	*10.9*
Feb. 5 . .	Charlestown . .	0.375	0.066	0.441	5.7	0.025	0.018	11.0
" 6 . .	Mystic Pond . .	*0.401*	*0.095*	*0.496*	*4.0*	*0.040*	*0.023*	*11.4*

TABLE II. — *Continued.*

Date.	Locality.	Organic Carbon.	Organic Nitrogen.	Sum of the Organic Elements.	Ratio. $\frac{\text{Carbon}}{\text{Nitrogen}}$.	Ammonia.	"Albuminoid Ammonia."	Total Solids.
Feb. 12 . .	Charlestown . .	0.442	0.060	0.502	7.4	0.037	0.018	11.4
" 17 . .	Mystic Pond . .	*0.471*	*0.057*	*0.528*	*8.3*	*0.025*	*0.021*	*8.8*
" 19 . .	Charlestown . .	0.421	0.044	0.465	9.6	0.035	0.020	10.1
" 26 . .	" . .	0.346	0.039	0.385	8.9	0.031	0.016	10.4
March 4 . .	" . .	0.347	0.039	0.386	8.9	0.033	0.016	9.9
" 6 . .	Mystic Pond . .	*0.349*	*0.040*	*0.389*	*8.7*	*0.044*	*0.017*	*10.3*
" 11 . .	Charlestown . .	0.356	0.062	0.418	5.7	0.027	0.016	9.7
" 19 . .	" . .	0.314	0.060	0.374	5.3	0.027	0.013	9.9
" 25 . .	" . .	0.322	0.062	0.384	5.2	0.027	0.015	10.4
April 1 . .	" . .	0.309	0.045	0.354	6.9	. .	. .	10.3
" 5 . .	Mystic Pond . .	*0.273*	*0.046*	*0.319*	*5.9*	*0.040*	*0.016*	*10.1*
" 9 . .	Charlestown . .	0.297	0.044	0.341	6.8	0.024	0.015	10.7
" 14 . .	Mystic Pond . .	. .	. .	. .	. .	*0.041*	*0.017*	*10.2*
" 15 . .	Charlestown . .	0.361	0.054	0.415	6.7	0.020	0.017	10.5
" 22 . .	" . .	0.297	0.060	0.357	4.9	0.013	0.016	10.8
" 29 . .	" . .	. .	. .	. .	. .	. .	. .	10.4
May 3 . .	Mystic Pond . .	*0.386*	*0.061*	*0.447*	*6.3*	*0.037*	*0.020*	*10.2*
" 6 . .	Charlestown . .	0.256	0.054	0.310	4.7	0.007	0.017	10.7
" 12 . .	Mystic Pond . .	*0.366*	*0.082*	*0.448*	*4.4*	*0.031*	*0.021*	*10.5*
" 13 . .	Charlestown . .	0.333	0.068	0.401	4.9	0.008	0.016	10.9
" 20 . .	" . .	0.359	0.073	0.432	4.9	0.008	0.016	10.5
" 24 . .	Mystic Pond . .	*0.332*	*0.045*	*0.377*	*7.4*	*0.031*	*0.021*	*10.6*
" 27 . .	Charlestown . .	0.358	0.061	0.419	5.9	0.009	0.021	10.8
June, '79, to May, '80,	Charlestown Mean of 35–39 samples . .	0.392	0.065	0.457	6.0	0.012	0.018	9.9
Oct., '79, to May '80,	Mystic Pond (surface.) Mean of 12–14 samples . .	*0.349*	*0.054*	*0.403*	*6.5*	*0.028*	*0.018*	*10.0*
Oct., '79, to May, '80,	Charlestown Mean of 19–20 samples[1] . .	0.339	0.053	0.392	6.6	0.019	0.015	9.8

[1] This average is made up from the samples drawn in Charlestown during the time within which samples from the pond have also been examined.

In studying the figures in the foregoing table we see very clearly one fact to which I have frequently called attention, namely, the great variation to which surface-waters are subject, and especially in respect to the organic matter which they contain. On this account it is seldom possible to form a just idea of the general

character of such a water from a single examination. This variation is rendered very large in the present instance because, during the summer, there was in Mystic pond, and in the water as drawn in the city, a very large amount of certain microscopic plants belonging to the *algæ*, and similar to those which occurred in such quantities in Horn pond in 1876.[1] A full description of these plants, with a plate, occurs in the Report of the State Board of Health, Lunacy, and Charity, for 1880.

In order that the effect of their presence may appear more clearly, I have prepared Table III., in which we have the results presented, first in monthly averages, and then in averages for certain periods into which there seemed to be a natural division. The *algæ* became numerous enough to awaken complaint and apprehension after the middle of July, and the trouble was at its height in the latter part of July and during August.

TABLE III. — *Examination of Mystic Water.*

(Results expressed in parts in 100,000.)

Date.	Number of Samples.	Sum of the Organic Elements.	"Albuminoid Ammonia."
1879.			
June	Mean of 2 samples	0.478	
July	" " 4 "	0.775	0.035[1]
August	" " 4 "	0.605	0.026
September	" " 3 "	0.448	0.020
October	" " 5 "	0.333	0.014
November	" " 2 "	0.393	0.011
December	" " 1 "	0.297	0.011
1880.			
January	" " 2 "	0.364	0.012
February	" " 3 "	0.469	0.019
March	" " 4 "	0.390	0.015
April	" " 4 "	0.389	0.016[2]
May	" " 4 "	0.390	0.017
1879.			
June 19 — July 3	" " 3 "	0.486	
July 10 — Aug. 7	" " 4 "	0.852	0.034
Aug. 14 — Sept 11	" " 4 "	0.526	0.022
Sept. 18 — May 27, '80	" " 28 "	0.389	0.016

[1] Mean of two samples.

[2] Mean of three samples.

[1] See First Annual Report of Boston Water Board, 1877.

Even in the absence of any abnormal condition such as was caused this summer by the growth of *algæ*, there is at times a considerable variation in the amount and character of the organic matter in the water, as, for instance, in October, 1879, when, on the 9th and 16th of the month, the nitrogen was very much below the usual amount; as again on December 4th. That such changes should take place is not at all surprising, although we may not be able to explain the reason why in each particular case. The water is taken from near the surface of the pond, flows in a conduit for some distance to the pumping-station, is pumped into an open reservoir, and thence distributed into the city. We know that the organic matter in natural water undergoes change with greater or less rapidity, owing to the difference of temperature, to the action of the wind, to the length of time during which the water is exposed to the sun and air in the reservoir, and to other such causes.

That the considerable variation in the amount and relative proportion of the organic carbon and organic nitrogen is not peculiar to Mystic water, may be seen from Table IV., compiled from the Sixth Report of the Rivers Pollution Commission, which shows the variation in the water of the several companies which supply the city of London, Eng. The same thing is true in other places as well.

Table IV. — *Variation in Monthly Samples of London Water, 1873.*

(Results expressed in parts in 100,000.)

Name of Company.	Organic Carbon.			Organic Nitrogen.		
	Maximum at any one time.	Minimum at any one time.	Mean of 12 Samples.	Maximum at any one time.	Minimum at any one time.	Mean of 12 Samples.
Chelsea	0.447	0.121	0.197	0.067	0.013	0.034
West Middlesex	0.341	0.114	0.173	0.055	0.015	0.028
Southwark	0.396	0.118	0.186	0.060	0.020	0.030
Grand Junction	0.412	0.117	0.183	0.050	0.016	0.032
Lambeth	0.449	0.130	0.206	0.065	0.021	0.040
New River	0.257	0.059	0.107	0.032	0.010	0.018
East London	0.333	0.109	0.175	0.082	0.015	0.035

In order to judge of the general character of the Mystic water, as shown by the results of Frankland's method of analysis, we have the necessary material in Table V., from which it appears that the total amount of organic matter, as indicated by the organic carbon and nitrogen, would be somewhat less than in Cochituate, were it not for the increase brought about by the development during the summer months of the *algæ*, to which allusion has been made. It

appears, however, that, on the whole, there is a *larger proportion* of nitrogen in the Mystic than in the Cochituate water; and this agrees with what we know of the character of the respective watersheds. Considering also that the total dissolved substances, organic and inorganic, amount to twice as much in the Mystic as in the Cochituate supply, we must regard the latter as the better water; the examination shows, however, as far as chemical examination can show, that, in spite of the polluting influences which have been at work in the ponds and streams supplying Mystic pond, the water, in its normal condition, is still good, and well suited for domestic supply.

There is one other point to which allusion might be made. In pursuit of some inquiries in which I have been engaged, I have had made a number of chemical examinations of the water of Mystic pond at the depth of eighteen feet, and also at the bottom of the pond. Since January we have been able, by having a buoy anchored in the pond, to take the samples at the same point where the water is seventy-five feet deep. Previous to that time we did not always succeed in finding the same spot, and some of the bottom samples were taken at a depth of fifty feet only. Being unable for the present to prosecute the research which I had planned, I should like to put the results thus far obtained on permanent record. They are included in tables VI. and VII.

Respectfully submitted,

WM. RIPLEY NICHOLS.

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, June, 1880.

TABLE V. — *Comparison of Mystic and other Waters.*

(Results expressed in parts in 100,000.)

Date.	Description.	Organic Carbon.	Organic Nitrogen.	Sum of the Organic Elements.	Ratio. $\frac{\text{Carbon}}{\text{Nitrogen.}}$
June, 1879—May, 1880	Mystic water as drawn in Charlestown. Mean of 39 samples	0.392	0.065	0.457	6.0
Sept. 18, 1879—May 27, 1880	Mystic water as above, — omitting the samples taken while the *algæ* were abundant. Mean of 28 samples	0.336	0.053	0.389	6.3
Jan., 1879—June, 1879	Boston water (Cochituate Lake and Sudbury River). Mean of 22 samples[1]	0.408	0.052	0.460	7.9
June, 1879—May, 1880	Boston water. Mean of 42 samples	0.452	0.051	0.503	8.9
Jan., 1879—June, 1879	Fresh Pond,[2] Cambridge. Mean of 11 samples	0.417	0.074	0.491	5.6
May, 1873—May, 1874	Loch Katrine water,[3] Glasgow, Scotland. Mean of 12 samples	0.197	0.018	0.215	10.9
	Unpolluted surface waters.[4] Mean of 195 samples	0.322	0.032	0.354	10.0

[1] Third Annual Report of Boston Water Board, 1879.
[2] These samples were taken from the pond itself, and the results do not claim to represent the water as delivered in Cambridge.
[3] Sixth Report of Rivers Pollution Commission, p. 347.
[4] Sixth Report of Rivers Pollution Commission, p. 425.

TABLE VI. — *Examination of Water in Mystic Lake.*

(Results expressed in parts in 100,000.)

Date.	Depth below Surface.	Ammonia.	"Albuminoid Ammonia."	Total Solids.
Oct. 18, 1879 . . .	18 feet	0.001	0.017	9.1
Nov. 8, 1879 . . .	"	0.008	0.011	9.6
Nov. 15, 1879 . .	"	0.008	0.013	9.6
Nov. 22, 1879 . .	"	0.015	0.013	9.8
Dec. 8, 1879 . . .	"	0.011	0.011	9.6
Jan. 30, 1880 . .	"	0.031	0.016	11.1
Feb. 6, 1880 . . .	"	0.035	0.019	11.1
Feb. 17, 1880 . .	"	0.041	0.016	10.8
March 6, 1880 . .	"	0.040	0.016	10.4
April 5, 1880 . .	"	0.040	0.013	10.2
April 14, 1880 . .	"	0.040	0.016	10.4
May 12, 1880 . .	"	0.032	0.016	10.5
May 24, 1880 . .	"	0.040	0.016	10.6
June 3, 1880 . . .	"	0.036	0.017	10.3
Average	. . . . .	0.027	0.015	10.2

TABLE VII. — *Examination of Water in Mystic Lake.*

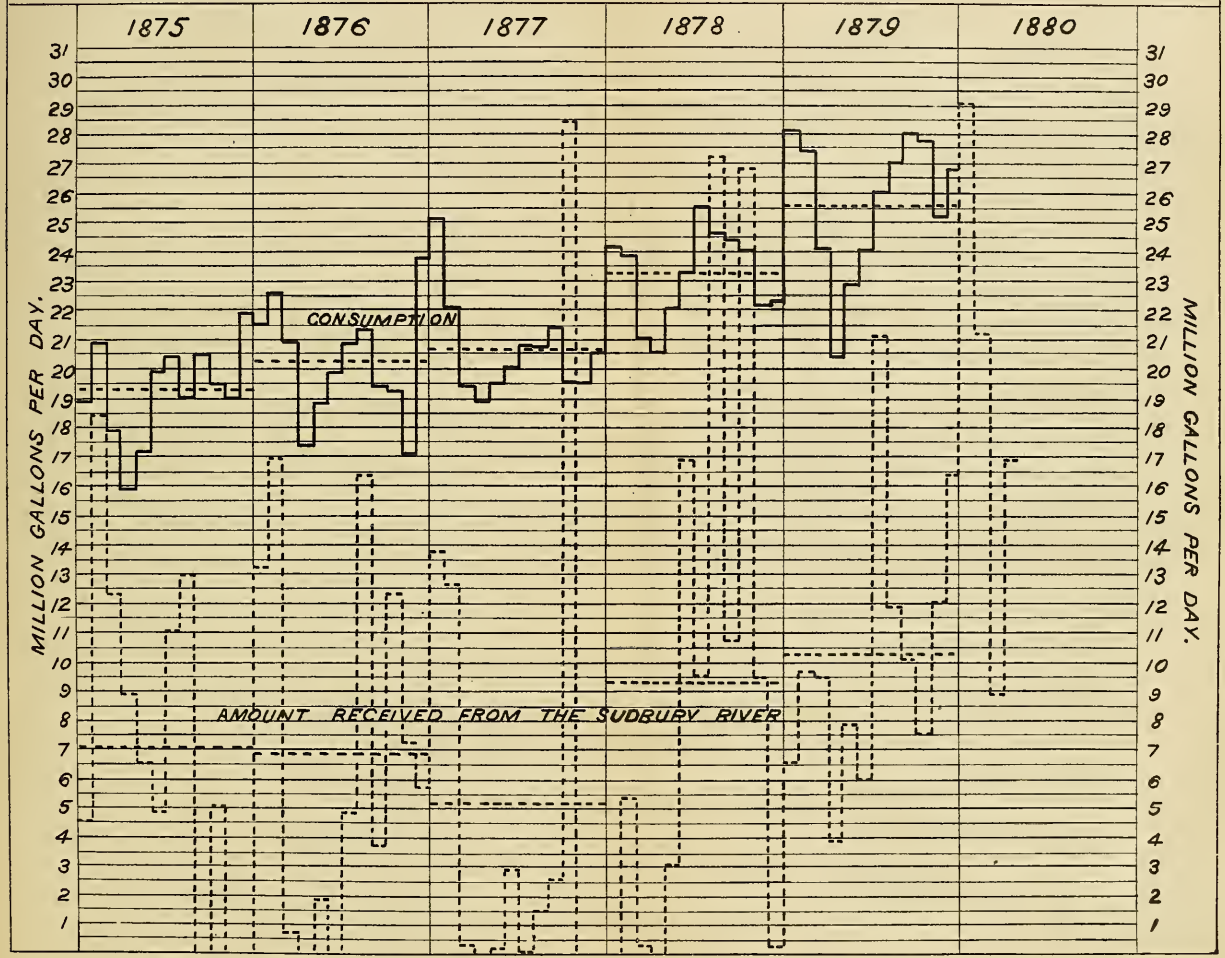
(Results expressed in parts in 100,000.)

Date.	Depth below Surface.	Organic Carbon.	Organic Nitrogen.	Sum of Organic Elements.	Ammonia.	"Albuminoid Ammonia."	Total Solids.
Oct. 18, 1879 . . .	69 feet.	. . . .	. . . .	. . . .	0.007	0.011	7.8
Nov. 8, " . . .	50 "	0.307	0.047	0.354	0.009	0.011	9.6
Nov. 15, " . . .	60 "	0.606	0.106	0.712	0.023	0.027	11.6
Nov. 22, " . . .	50 "	0.309	0.047	0.356	0.016	0.017	9.6
Dec. 8, " . . .	54 "	0.288	0.041	0.329	0.011	0.008	9.7
Jan. 30, 1880 . . .	70–78 "	0.403	0.033	0.436	0.027	0.016	11.8
Feb. 6, " . . .	70–78 "	0.514	0.071	0.585	0.080	0.019	11.8
Feb. 17, " . . .	70–78 "	0.440	0.096	0.536	0.075	0.017	11.5
March 6, " . . .	70–78 "	0.312	0.032	0.344	0.040	0.015	9.5
April 5, " . . .	70–78 "	0.287	0.037	0.324	0.041	0.013	10.2
April 14, " . . .	70–78 "	0.295	0.086	0.381	0.043	0.017	10.3
May 3, " . . .	70–78 "	. . . .	. . . .	. . . .	0.048	0.019	10.1
May 12, " . . .	70–78 "	0.338	0.063	0.401	0.064	0.016	10.3
May 24, " . . .	70–78 "	0.363	0.083	0.446	0.064	0.015	10.5
June 3, " . . .	70–78 "	0.318	0.077	0.395	0.049	0.016	10.6
Average at bottom		0.368	0.063	0.431	0.040	0.016	10.3
Average at 18 ft. from top (Table VI.) .		. . . .	. . . .	. . . .	0.027	0.015	10.2
Average at top during the same time, Oct., '79—June, '80		0.349	0.054	0.403	0.028	0.018	10.0
Average as drawn in Charlestown during the same time		0.339	0.053	0.392	0.019	0.015	9.8

BOSTON WATER WORKS.

DIAGRAM SHOWING THE DAILY AVERAGE CONSUMPTION FROM THE COCHITUATE WORKS, AND AMOUNT RECEIVED FROM THE SUDBURY RIVER, 1875 TO 1880.

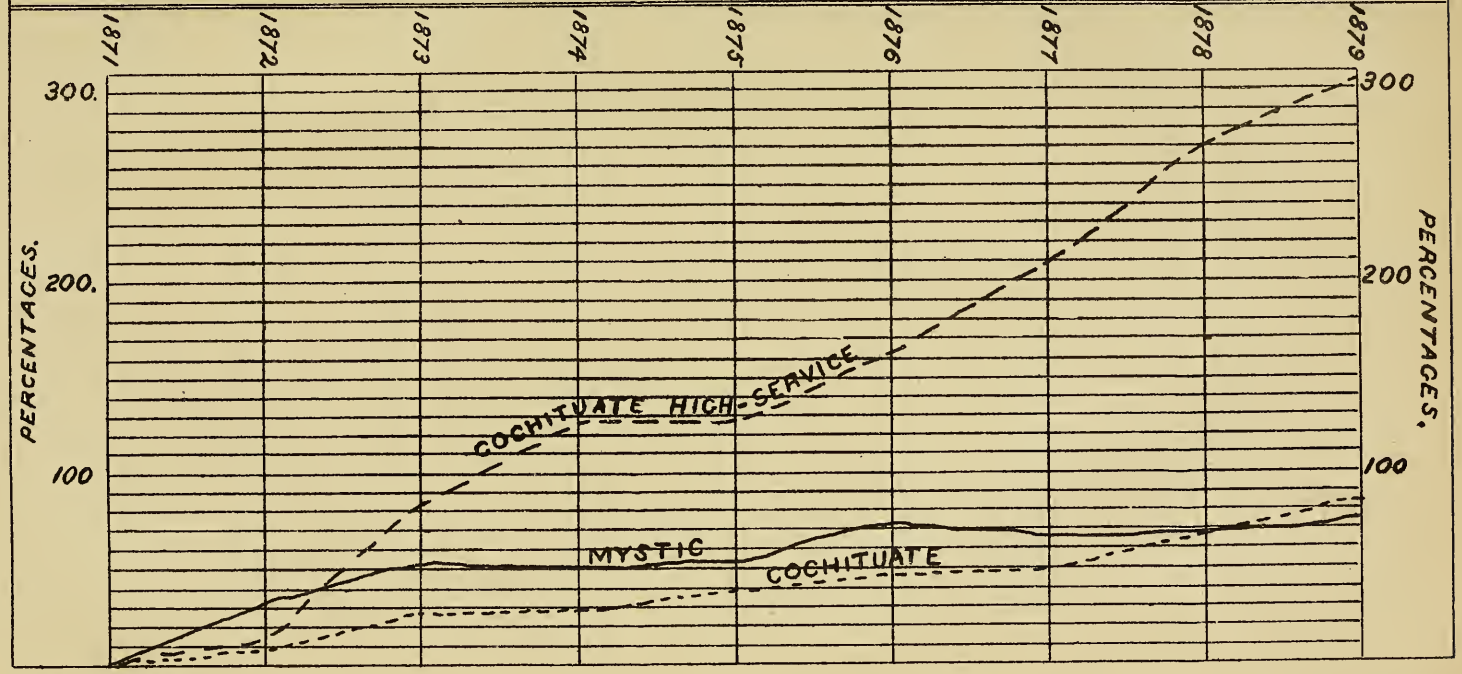
YEARLY AVERAGES SHOWN THUS:----------



The Kelliotype Printing Co 211 Tremont St Boston

BOSTON WATER WORKS.

DIAGRAM SHOWING THE YEARLY PERCENTAGE OF INCREASE IN CONSUMPTION SINCE 1871 FROM THE COCHITUATE, COCHITUATE HIGH SERVICE AND MYSTIC WORKS.



The Heliotype Printing Co 211 Tremont St Boston

Amount of Water diverted from the Sudbury River to Lake Cochituate and Chestnut-Hill Reservoir, 1872 and 1875 to 1879.

Month.	1872.	1875.	1876.	1877.	1878.		1879.	
	To Lake Cochituate.	To Lake Cochituate.	To Lake Cochituate.	To Lake Cochituate.	To Lake Cochituate.	To Chestnut-Hill Reservoir.	To Lake Cochituate.	To Chestnut-Hill Reservoir.
	Gallons.	*Gallons.*	*Gallons.*	*Gallons.*	*Gallons.*	*Gallons.*	*Gallons.*	*Gallons.*
January	Total, June 19th to September 17th, 1,676,600,000 gallons.	140,400,000	410,300,000	427,200,000	.....	.....	.....	204,600,000
February		517,200,000	491,400,000	353,700,000	4,700,000	148,400,000	.....	272,300,000
March		380,300,000	22,000,000	8,200,000	12,000,000	.....	.....	295,100,000
April		265,700,000	.....	.....	.....	.....	.....	217,700,000
May		203,100,000	61,100,000	6,400,000	98,000,000	.....	.....	245,900,000
June		144,300,000	.....	87,500,000	504,100,000	.....	.....	180,800,000
July		343,100,000	149,300,000	2,660,000	177,300,000	118,200,000	333,100,000	322,500,000
August		402,900,000	507,500,000	47,990,000	747,200,000	96,400,000	45,500,000	322,100,000
September		.....	111,800,000	78,400,000	287,300,000	34,900,000	9,300,000	294,600,000
October		158,800,000	380,800,000	882,300,000	661,600,000	168,400,000	.....	234,800,000
November		.....	215,800,000	.....	176,100,000	109,500,000	21,400,000	339,300,000
December		.....	178,300,000	.....	.....	78,000,000	2,000,000	508,200,000
Totals	1,676,600,000	2,555,800,000	2,528,300,000	1,894,350,000	2,668,300,000	753,800,000	411,300,000	3,337,900,000
Total diversion from Sudb'ry river	1,676,600,000	2,555,800,000	2,528,300,000	1,894,350,000	3,422,100,000		3,749,200,000	
Average daily diversion for year	4,581,000	7,002,000	6,908,000	5,190,000	9,376,000		10,272,000	

Amount diverted for the year ending May 1, 1880, 5,162,800,000 gallons. Daily average, 14,106,000 gallons.

Daily Average Consumption of Water, in Gallons, from the Cochituate and Mystic Works.

	COCHITUATE WORKS.							MYSTIC WORKS.						
MONTH.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1873.	1874.	1875.	1876.	1877.	1878.	1879.
January . . .	17,639,100	16,651,300	18,978,300	21,550,200	25,129,300	24,210,600	28,190,200	9,460,487	8,291,307	11,137,400	9,896,737	11,859,854	10,325,705	11,111,972
February . . .	18,461,000	19,103,850	20,991,700	22,675,200	22,071,800	23,848,700	27,446,300	9,829,319	9,705,467	11,150,000	10,601,013	9,982,621	9,944,140	11,253,090
March	15,983,700	17,657,300	17,878,100	20,931,500	19,446,600	21,019,500	24,163,800	8,058,772	8,110,458	10,058,700	9,396,910	8,578,935	8,192,825	9,851,219
April	14,781,800	15,929,600	15,852,000	17,300,500	18,988,800	20,628,300	20,421,800	6,653,165	6,849,252	7,671,800	7,568,052	7,200,533	7,365,951	8,311,620
May	17,637,400	16,731,900	17,164,500	18,837,800	19,520,300	22,023,500	22,953,800	6,680,009	6,735,285	5,663,224	7,610,317	7,250,492	7,717,476	8,523,744
June	20,100,600	19,239,750	19,923,400	19,872,300	20,192,400	23,360,600	24,101,200	7,651,899	7,202,680	6,505,015	8,560,937	8,190,530	8,383,667	9,054,267
July	20,917,100	21,389,200	20,396,400	20,820,600	20,799,400	25,620,000	26,156,900	7,966,844	7,861,818	6,494,046	9,152,492	8,371,295	9,087,658	9,150,925
August	19,544,600	20,127,800	19,085,200	21,333,900	20,778,400	24,679,600	27,075,100	7,970,872	7,589,671	6,124,240	8,600,788	8,121,402	8,751,038	8,027,325
September . .	19,572,700	20,022,600	20,497,400	19,430,800	21,499,500	24,469,700	28,017,800	7,658,814	7,424,292	6,224,227	8,619,557	8,242,180	8,767,490	7,614,951
October	17,113,800	19,320,900	19,470,700	19,214,000	19,598,700	24,100,700	27,702,600	7,045,124	7,118,184	5,931,448	8,081,052	8,780,799	7,900,000	7,771,578
November . .	16,633,400	14,319,500	19,076,400	17,023,700	19,577,500	22,200,600	25,299,200	6,808,696	6,972,835	5,971,798	7,153,629	7,396,879	7,525,957	7,372,892
December . . .	15,727,100	16,407,950	21,898,500	23,783,000	20,535,900	22,298,500	26,831,900	7,411,711	7,854,951	10,087,886	10,673,036	7,732,921	8,227,314	8,585,799
Yearly average,	17,842,700	18,074,900	19,267,700	20,237,700	20,673,500	23,205,700	25,695,900	7,766,309	7,643,017	7,751,649	8,825,808	8,386,257	8,515,768	8,883,470

Statement showing Amount of Water diverted from Sudbury River to Lake Cochituate and Chestnut-Hill Reservoir; Amount wasted; Amount of flow in river, percentage of Rainfall collected, etc., 1875 to 1879.

(Water-shed from 1875 to 1878, inclusive, = 77,764 sq. miles, and in 1879, = 78,238 sq. miles.)

YEAR.	Amount of water diverted to Lake Cochituate and Chestnut-Hill Reservoir.	Amount of water wasted from River.	STORAGE.		Total amount of flow in River.	Daily average amount of flow in River.	Rainfall.	Rainfall collected.	Percentage of Rainfall collected.
			Gain.	Loss.					
	Gallons.	*Gallons.*	*Gallons.*	*Gallons.*	*Gallons.*	*Gallons.*	*Inches.*	*Inches.*	*Per cent.*
1875	2,555,800,000	24,971,600,000	66,300,000	. . . . .	27,593,700,000	75,599,200	45.490	20.418	44.88
1876	2,528,300,000	29,942,300,000	. . . . .	160,700,000	32,309,900,000	88,278,400	49.563	23.908	48.24
1877	1,894,350,000	29,438,300,000	112,100,000	. . . . .	34,444,750,000	94,369,200	44.018	25.487	57.90
1878	3,422,100,000	37,125,200,000	654,700,000	. . . . .	41,202,000,000	112,882,200	57.931	30.487	52.63
1879	3,749,200,000	20,817,500,000	962,200,000	. . . . .	25,528,900,000	69,942,200	41.419	18.775	45.33
Averages	2,829,950,000	29,058,980,000	. . . . .	. . . . .	32,215,850,000	88,214,240	47.684	23.815	49.94

Statement showing amount of Water drawn from Lake Cochituate; Amount wasted; Amount of Rainfall collected in Lake; Amount received into Lake from Sudbury River; Percentage of Rainfall collected, etc., 1852 to 1879. Water-shed of Lake = 12,077 acres.

Year.	Amount of Water drawn from Lake.	Amount of Water wasted from Lake.	Amount received into Lake from Sudbury River.	STORAGE.		Total amount of Rainfall collected in Lake.	Daily average amount of Rainfall collected in Lake.	Rainfall.	Rainfall collected.	Percentage of Rainfall collected.
				Gain.	Loss.					
	Gallons.	*Gallons.*	*Gallons.*	*Gallons.*	*Gallons.*	*Gallons.*	*Gallons.*	*Inches.*	*Inches.*	*Per cent.*
1852[1]	2,974,042,800	4,020,566,900	.....	261,300,000	261,300,000	6,733,249,700	18,396,900	47.93	20.61	43.
1853	3,117,939,500	3,166,417,500	.....	239,580,000	.....	6,523,937,000	17,873,800	55.73	19.51	35.
1854	3,614,230,000	4,187,733,000	.....	.....	217,800,000	7,584,163,000	20,778,500	43.15	22.87	53.
1855	3,776,399,500	No account kept	.....	.....	326,700,000	.....	.....	54.96	.....	.....
1856	4,409,787,600	" " "	.....	598,950,000	.....	.....	.....	40.80	.....	.....
1857	4,644,990,000	10,625,900,000	.....	32,670,000	.....	15,303,560,000	41,927,600	63.10	46.69	74.
1858	4,689,155,000	1,934,500,000	.....	.....	141,570,000	6,482,085,000	17,759,000	48.66	19.46	40.
1859[2]	4,808,875,000	7,569,000,000	.....	283,140,000	.....	12,661,015,000	34,687,700	49.02	38.24	78.
1860	6,309,108,000	None.	.....	174,240,000	.....	6,483,348,000	17,714,100	55.44	19.40	35.
1861	6,639,095,900	3,377,559,000	.....	.....	1,459,260,000	8,557,394,900	23,444,900	45.44	25.45	56.
1862	6,059,000,000	33,200,000	.....	1,306,800,000	.....	7,399,000,000	20,271,200	49.69	22.36	45.
1863	5,927,052,500	2,165,696,500	.....	762,300,000	.....	8,855,049,000	24,260,400	69.30	27.03	39.
1864	6,105,306,700	1,368,746,000	.....	.....	1,848,577,000	5,625,475,700	15,370,200	42.60	17.04	40.
1865	4,621,630,000	1,688,120,700	.....	743,242,500	.....	7,052,993,200	19,323,300	49.46	21.27	43.
1866	4,463,585,000	None.	.....	743,242,500	.....	5,206,827,500	14,265,300	62.32	15.58	25.

1867	4,951,225,000	2,482,041,000	. . . . .	. . . . .	698,811,000	6,734,455,000	18,450,600	56.25	20.25	36.
1868	5,405,515,000	2,507,684,000	. . . . .	346,371,000	. . . . .	8,259,570,000	22,567,200	49.71	24.86	50.
1869	5,500,696,000	1,635,570,000	. . . . .	480,882,000	. . . . .	7,620,203,000	20,877,300	64.34	23.16	36.
1870	5,477,810,000	4,818,971,000	. . . . .	. . . . .	1,736,085,000	8,560,696,000	23,453,900	55.89	26.27	47.
1871	5,223,500,000	None.	. . . . .	. . . . .	250,933,000	4,972,567,000	13,623,500	45.39	14.98	33.
1872	5,775,151,200	None.	1,676,666,400	1,543,995,500	. . . . .	5,642,480,300	15,416,600	48.47	16.96	35.
1873	6,511,826,900	2,917,977,000	. . . . .	. . . . .	515,132,000	8,914,671,900	24,423,800	45.43	27.26	60.
1874	6,623,972,900	1,145,851,700	. . . . .	. . . . .	1,367,715,000	6,402,109,600	17,540,000	35.93	19.40	54.
1875	7,092,955,500	None.	2,555,800,000	1,222,885,000	. . . . .	5,760,040,500	15,780,900	45.49	17.74	39.
1876	7,277,175,200	1,619,243,800	2,528,300,000	43,438,000	. . . . .	6,411,557,000	17,517,900	48.49	19.40	40.
1877	7,626,889,200	1,484,978,600	1,894,350,000	378,727,000	. . . . .	7,596,244,800	20,811,600	43.80	23.21	53.
1878	7,743,904,700	3,341,875,000	2,668,300,000	219,788,000	. . . . .	8,637,267,700	23,663,700	53.58	26.25	49.
1879	6,051,838,900	1,523,361,400	411,300,000	. . . . .	1,322,697,300	5,841,203,000	16,003,300	38.01	17.86	47.
Averages . . .	5,479,380,600	2,446,730,700	. . . . .	. . . . .	. . . . .	7,531,583,200	20,623,200	49.59	22.81	45.6

[1] Observation of rainfall at Lake Cochituate commenced 1852, and these observations are assumed as correct for the whole district.
[2] Lake raised two feet.

Statement showing Amount of Water drawn from Mystic Lake; Amount wasted; Amount of Rainfall collected in Lake; Percentage of Rainfall collected, etc., 1876 to 1879. Water-shed of Lake, 17,200 acres.

YEAR.	Amount of water drawn from Lake.	Amount of water wasted from Lake.	STORAGE.		Total amount of Rainfall collected in Lake.	Daily average amount of Rainfall collected in Lake.	Rainfall.	Rainfall collected.	Percentage of Rainfall collected.
			Gain.	Loss.					
	Gallons.	*Gallons.*	*Gallons.*	*Gallons.*	*Gallons.*	*Gallons.*	*Inches.*	*Inches.*	*Per cent.*
1876	3,230,101,300	6,369,774,700	. . . . .	32,583,000	9,567,293,000	26,140,100	47.00	20.49	43.6
1877	3,069,554,800	7,250,223,500	. . . . .	16,291,400	10,303,486,900	28,228,700	43.095	22.06	51.2
1878	3,354,371,200	8,714,479,600	. . . . .	28,672,900	12,040,177,900	32,986,800	54.065	25.79	47.7
1879	3,736,107,800	4,625,691,800	. . . . .	233,944,900	8,127,854,700	22,268,000	35.30	17.61	49.9
Averages	3,347,533,800	6,740,042,400	. . . . .	. . . . .	10,009,703,200	27,405,900	44.865	21.49	48.1

Table showing the average monthly and yearly Heights above tide marsh level of the Water in the Lakes and Reservoirs of the Boston Water Works.

MONTH.	Reservoir No. 1. Flash-boards 159.29.		Reservoir No. 2. Flash-boards 167.12.		Reservoir No. 3. Stone crest 175.24.		Farm Pond. High water 149.25.		Lake Cochituate. High water 134.36.		Chestnut-Hill Reservoir. High water 124.00.		Brookline Reservoir. High water 124.60.		Parker-Hill Reservoir. High water 219.00.		Mystic Lake. High water 7.00.		Mystic Reservoir. High water 147.00.	
	1878	1879	1878	1879	1878	1879	1878	1879	1878	1879	1878	1879	1878	1879	1878	1879	1878	1879	1878	1879
Jan. .		149.76		151.21		171.22	148.97	148.36	132.44	132.64	121.66	122.25	121.03	121.34	217.58	217.09	5.94	5.93	146.39	146.69
Feb. .		155.75		157.75		172.27	149.70	149.18	132.71	132.54	121.99	122.76	121.31	122.12	217.32	217.43	5.65	5.99	146.49	146.58
March.		158.27		158.27		170.74	149.68	149.06	133.33	133.32	122.91	123.38	122.53	122.90	216.80	217.62	5.51	5.77	146.45	146.61
April .		155.44		155.68		172.53	148.71	148.81	133.13	133.69	122.95	123.11	122.59	122.63	217.00	218.15	6.04	5.89	146.39	146.58
May .	Reservoir empty.		Reservoir empty.		Storage commenced Dec. 3.	174.39	147.66	147.47	133.69	133.72	122.96	123.31	122.59	122.89	217.13	217.69	6.31	6.20	146.39	146.34
June .				Res. empty from May 1, to Aug. 19.		175.59	147.80	147.03	133.71	132.91	122.08	122.90	121.56	122.38	217.68	217.98	6.24	6.22	146.23	146.47
July .						174.06	147.44	147.04	133.07	131.96	122.18	123.01	121.65	122.47	218.07	218.49	4.89	4.79	146.12	146.56
Aug. .		Reservoir empty.				171.46	147.51	147.81	133.18	131.41	122.41	122.54	121.76	121.81	217.61	218.04	5.41	3.45	146.32	146.50
Sept. .				164.43		172.32	146.97	148.66	133.36	130.46	121.91	123.21	118.69	122.67	217.52	217.60	5.22	3.86	145.36	146.54
Oct. .				163.17		171.89	147.04	149.01	132.29	128.51	122.85	122.78	122.38	122.46	217.34	217.79	3.97	2.41	. . . .	146.50
Nov. .				158.62		172.32	147.22	149.33	133.75	126.84	123.56	123.06	123.15	121.91	216.88	217.89	5.17	1.13	. . . .	146.68
Dec. .		151.50		162.10	169.54	174.11	147.88	149.19	133.57	126.56	123.26	122.51	122.82	121.00	217.36	218.39	5.97	1.26	146.53	146.63
Yearly average.	. . .	. . .	. . .	. . .	. . .	172.74	148.05	148.41	133.19	131.21	122.56	122.90	121.84	122.21	217.36	217.85	5.53	4.41	. . . .	146.56

Statement of Operations at the Highland Pumping-Station for the year 1879.

1879.	Engine No. 2.			Worthington Engine.			Total amount pumped by both engines.	Daily average amount pumped.	Total amount of coal consumed.	Daily average amount of coal consumed.	Per cent. ashes and clinkers.	Quantity pumped per pound of coal.	Average lift in feet.	Duty in ft.-lbs. per 100 lbs. of total coal by Worthington engine.
	Total pumping time.		Total amount pumped.	Total pumping time.		Total amount pumped.								
	Hrs.	*Min.*	*Gallons.*	*Hrs.*	*Min.*	*Gallons.*	*Gallons.*	*Gallons.*	*Lbs.*	*Lbs.*	*Per cent.*	*Gallons.*	*Ft.*	*Ft.-lbs.*
January . .	. . . .	. . . .	. . . . .	651	. . . .	79,360,000	79,360,000	2,560,000	150,400	4,852	12.7	527.7	118.04	51,946,100
February . .	. . . .	. . . .	. . . . .	588	. . . .	67,084,000	67,084,000	2,395,857	122,900	4,389	11.5	545.8	115.27	52,474,200
March . . .	. . . .	. . . .	. . . . .	651	. . . .	69,083,500	69,083,500	2,228,500	124,200	4,006	11.6	556.2	112.04	51,972,400
April	. . . .	. . . .	. . . . .	633	. . . .	60,357,000	60,357,000	2,011,900	106,500	3,550	12.7	556.7	109.96	51,971,200
May	7	30	443,210	636	55	67,704,000	68,147,210	2,198,297	120,700	3,894	13.	568.3	111.11	52,659,900
June	. . . .	. . . .	. . . . .	630	. . . .	70,339,000	70,339,000	2,344,633	124,000	4,133	13.	567.3	110.88	52,455,800
July	. . . .	. . . .	. . . . .	644	52	69,409,000	69,409,000	2,239,000	128,690	4,151	15.1	539.5	113.65	51,122,800
August . . .	. . . .	. . . .	. . . . .	650	. . . .	72,044,000	72,044,000	2,324,000	133,900	4,319	14.7	538	116.89	52,450,000
September .	. . . .	. . . .	. . . . .	630	. . . .	66,371,000	66,371,000	2,212,367	126,100	4,203	15.3	526.3	117.35	51,511,600
October . .	. . . .	. . . .	. . . . .	651	. . . .	66,185,000	66,185,000	2,135,000	121,700	3,926	14.3	543.8	116.66	52,910,100
November .	. . . .	. . . .	. . . . .	630	. . . .	63,550,000	63,550,000	2,118,333	118,800	3,960	13.1	534.9	116.19	51,837,700
December .	. . . .	. . . .	. . . . .	651	. . . .	68,897,500	68,897,500	2,222,500	132,700	4,281	13.4	519.2	118.04	51,113,000
Averages and Totals.	7	30	443,210	7,646	47	820,384,000	820,827,210	2,248,842	1,510,500	4,138	13.4	543.4	114.81	52,057,100

Statement of Operations at the Mystic Pumping-Station for the year 1879.

1879.	Engine No. 1.			Engine No. 2.			Engine No. 3.			Total amount pumped.	Daily average amount pumped.	Daily average amount coal consumed.	Per cent. ashes and clinkers.	Quantity pumped per lb. coal.	Average lift in feet.	Duty in ft.-lbs. per 100 lbs. of total coal.
	Total pumping time.		Total amount pumped.	Total pumping time.		Total amount pumped.	Total pumping time.		Total amount pumped.							
	Hrs.	*Min.*	*Gallons.*	*Hrs.*	*Min.*	*Gallons.*	*Hrs.*	*Min.*	*Gallons.*	*Gallons.*	*Gallons.*	*Lbs.*	*%*	*Gals.*	*Ft.*	*Ft.-lbs.*
January	. . .	. . .	. . . . .	624	. . .	118,475,204	739	45	225,865,728	344,340,932	11,107,772	27,103	7.3	409.8	149.91	51,239,300
February	. . .	. . .	. . . . .	616	30	114,803,488	669	37	200,181,760	314,985,248	11,249,473	27,286	7.4	412.3	149.75	51,490,800
March	. . .	. . .	. . . . .	532	15	89,781,279	735	30	215,967,744	305,749,023	9,862,872	24,342	6.9	405.2	149.25	50,448,100
April	10	45	1,848,542	109	34	19,936,530	711	15	227,737,600	249,522,672	8,317,422	20,703	7.	401.7	148.74	49,835,900
May	587	15	108,688,894	576	45	112,028,712	140	15	45,676,032	266,393,638	8,593,343	21,632	7.	397.3	148.99	49,254,900
June	637	45	118,290,380	533	30	101,576,492	159	30	52,181,504	272,048,376	9,068,279	21,623	7.4	419.2	148.67	52,110,500
July	266	. . .	44,334,808	. . .	. . .	. . . . .	741	. . .	239,868,928	284,203,736	9,167,762	21,013	8.5	436.3	149.29	54,318,700
August	29	15	4,900,856	28	45	5,243,324	716	45	238,456,320	248,600,500	8,019,371	18,087	8.3	443.4	148.95	55,078,100
September	43	15	7,077,370	57	15	10,009,790	672	45	210,708,992	227,796,152	7,593,205	17,257	7.5	440.	149.08	54,708,400
October	69	15	15,323,178	17	. . .	3,591,082	705	15	222,874,624	241,788,884	7,799,641	18,116	7.6	430.5	149.45	53,656,800
November	. . .	. . .	. . . . .	6	. . .	1,292,862	700	40	219,705,344	220,998,206	7,366,607	17,217	7.4	427.9	149.86	53,477,400
December	85	45	14,936,618	111	. . .	21,708,364	744	. . .	229,775,872	266,420,854	8,594,221	20,484	7.4	419.6	150.28	52,585,000
Averages and Totals.	1,729	15	315,400,646	3,212	34	598,447,127	7,436	17	2,329,000,448	3,242,848,221	8,884,516	21,211	7.5	418.8	149.36	52,175,700

Table showing Rainfall on Sudbury River Water-shed for the year 1879.

1879.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
1	. . .	. . .	. . .	. . .	0.056	. . .	. . .	. . .	. . .	. . .	. . .	. . .
2	0.332	. . .	. . .	. . .	. . .	0.010	. . .	. . .	. . .	. . .	. . .	. . .
3	. . .	. . .	. . .	0.134	. . .	. . .	. . .	0.004	. . .	. . .	. . .	. . .
4	. . .	. . .	. . .	. . .	. . .	1.036	0.509	. . .	0.798	. . .	0.638	0.196
5	. . .	0.180	. . .	. . .	. . .	0.074	. . .	. . .	. . .	. . .	. . .	. . .
6	. . .	. . .	0.31	. . .	0.075	0.173	. . .	. . .	. . .	. . .	0.160	. . .
7	. . .	. . .	. . .	. . .	. . .	0.004	0.156	. . .	. . .	. . .	. . .	0.810
8	0.001	. . .	. . .	. . .	. . .	. . .	0.622	0.198	0.238	. . .	. . .	0.051
9	. . .	0.028	0.107	. . .	. . .	. . .	. . .	. . .	. . .	. . .	0.018	. . .
10	1.144	. . .	0.040	. . .	. . .	0.566	. . .	. . .	. . .	. . .	. . .	. . .
11	0.001	1.406	. . .	1.316	. . .	. . .	. . .	. . .	0.056	0.092	. . .	0.163
12	. . .	. . .	. . .	. . .	. . .	0.064	0.270	. . .	. . .	. . .	. . .	. . .
13	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	0.478	. . .
14	. . .	. . .	0.068	. . .	. . .	. . .	. . .	0.108	0.395	. . .	. . .	. . .
15	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	0.030	1.038
16	0.928	. . .	. . .	0.268	0.382	0.814	0.387	. . .	0.018	. . .	. . .	. . .
17	. . .	. . .	0.919	. . .	. . .	0.010	. . .	. . .	. . .	. . .	. . .	. . .
18	0.018	0.416	. . .	. . .	. . .	0.003	0.206	5.754	0.012	. . .	0.660	. . .
19	. . .	. . .	. . .	2.030	. . .	. . .	. . .	. . .	. . .	0.262	. . .	0.048
20	0.020	0.440	. . .	. . .	1.050	. . .	. . .	. . .	. . .	. . .	0.090	. . .
21	0.004	. . .	0.156	. . .	. . .	. . .	0.012	. . .	. . .	. . .	. . .	. . .
22	0.010	. . .	. . .	. . .	. . .	. . .	. . .	0.040	0.005	0.020	. . .	0.704
23	. . .	. . .	1.176	. . .	. . .	. . .	0.125	. . .	. . .	0.031	0.003	. . .
24	0.002	. . .	. . .	. . .	. . .	. . .	. . .	0.044	0.356	. . .	. . .	0.514
25	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	0.024
26	. . .	0.480	. . .	0.102	. . .	. . .	. . .	0.354	. . .	. . .	. . .	. . .
27	. . .	0.612	. . .	. . .	0.016	. . .	1.642	. . .	. . .	. . .	. . .	. . .
28	0.018	. . .	1.064	. . .	. . .	0.217	. . .	. . .	. . .	0.404	. . .	. . .
29	. . .	. . .	. . .	. . .	. . .	0.752	0.004	0.007	. . .	. . .	0.605	0.105
30	. . .	. . .	0.53	0.866	. . .	0.016	. . .	. . .	. . .	. . .	. . .	. . .
31	. . .	. . .	0.77	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	0.691
Totals .	2.478	3.562	5.140	4.716	1.579	3.789	3.933	6.509	1.878	0.809	2.682	4.344

Total for the year . . . . . 41.419 inches

Being an average from five gauges, located at Framingham Centre, Southboro', Marlboro', Westboro', and Hopkinton.

Table showing Rainfall at Lake Cochituate for the year 1879.

1879.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
1	. . .	. . .	. . .	. . .	0.06	. . .	. . .	. . .	. . .	. . .	. . .	. . .
2	0.40	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
3	. . .	. . .	. . .	0.18	. . .	. . .	. . .	. . .	. . .	. . .	0.70	. . .
4	. . .	. . .	. . .	. . .	. . .	1.34	0.26	. . .	0.48	. . .	. . .	0.18
5	. . .	0.18	. . .	. . .	. . .	0.16	. . .	. . .	. . .	. . .	. . .	. . .
6	. . .	. . .	0.26	. . .	0.04	0.28	. . .	. . .	. . .	. . .	0.13	. . .
7	. . .	. . .	. . .	. . .	. . .	. . .	0.25	. . .	. . .	. . .	. . .	0.54
8	. . .	. . .	. . .	. . .	. . .	. . .	0.60	0.14	0.28	. . .	. . .	0.09
9	0.85	. . .	0.12	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
10	. . .	. . .	0.06	. . .	. . .	0.19	0.02	. . .	. . .	. . .	. . .	. . .
11	. . .	. . .	. . .	1.26	. . .	0.02	. . .	. . .	. . .	. . .	. . .	0.17
12	. . .	1.16	. . .	0.05	. . .	0.06	0.14	. . .	. . .	0.03	. . .	. . .
13	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	0.48	. . .
14	. . .	. . .	0.10	. . .	. . .	. . .	. . .	. . .	0.52	. . .	. . .	1.03
15	. . .	. . .	. . .	0.26	. . .	1.00	. . .	. . .	. . .	. . .	0.04	. . .
16	0.64	. . .	. . .	0.18	0.18	0.04	0.82	. . .	0.08	. . .	0.02	. . .
17	. . .	. . .	0.87	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
18	0.04	0.22	. . .	. . .	. . .	. . .	0.15	5.50	. . .	. . .	0.05	. . .
19	. . .	. . .	. . .	1.70	0.92	. . .	. . .	. . .	. . .	0.22	0.68	0.03
20	0.03	0.35	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	0.21	. . .
21	. . .	. . .	0.15	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
22	. . .	. . .	. . .	. . .	. . .	. . .	0.10	0.02	. . .	0.02	. . .	0.36
23	. . .	. . .	1.02	. . .	. . .	. . .	0.09	. . .	. . .	0.03	. . .	. . .
24	. . .	. . .	. . .	. . .	. . .	. . .	. . .	0.26	0.38	. . .	. . .	0.50
25	. . .	0.42	. . .	0.04	. . .	. . .	. . .	0.28	. . .	. . .	. . .	0.04
26	. . .	0.72	. . .	. . .	. . .	0.02	. . .	. . .	. . .	. . .	. . .	. . .
27	. . .	. . .	. . .	. . .	. . .	. . .	0.95	. . .	. . .	. . .	. . .	. . .
28	0.04	. . .	0.72	. . .	. . .	0.18	. . .	. . .	. . .	0.60	. . .	. . .
29	. . .	. . .	. . .	0.44	. . .	0.85	. . .	0.13	. . .	. . .	0.67	0.11
30	. . .	. . .	. . .	0.58	. . .	. . .	. . .	0.10	. . .	. . .	. . .	. . .
31	. . .	. . .	0.60	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	0.55
Totals.	2.00	3.05	3.90	4.69	1.20	4.14	3.38	6.43	1.74	0.90	2.98	3.60

Total for the year . . . . . 38.01 inches.

Table showing Rainfall on Mystic Water-shed for the year 1879.

1879.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November	December
1	...	...	...	...	...	...	...	...	...	...	...	...
2	0.50	...	...	...	...	0.26	...	...	0.05	...	...	...
3	...	...	...	0.085	...	0.40	...	...	0.60	...	0.54	...
4	...	...	...	...	0.01	0.60	0.045	...	0.02	...	...	0.13
5	...	0.15	0.02	...	...	...	...	...	...	...	...	...
6	...	...	0.19	...	...	0.09	...	0.09	...	...	0.19	0.47
7	...	...	...	...	...	...	...	...	...	...	...	...
8	...	...	...	...	...	...	0.78	0.04	0.22	...	...	...
9	0.86	0.01	0.05	...	...	...	...	...	0.02	...	...	...
10	...	...	...	1.17	...	0.06	...	...	...	...	0.05	0.21
11	...	0.97	0.06	0.02	...	0.02	...	...	0.02	0.02	...	0.01
12	...	0.22	...	...	...	0.01	...	...	...	...	0.37	...
13	...	...	...	...	...	0.02	...	...	...	...	0.02	...
14	...	...	0.12	...	...	0.02	...	...	0.28	...	0.01	0.86
15	...	...	...	0.33	...	1.39	...	...	...	...	...	...
16	0.40	...	...	...	0.23	0.03	0.425	0.98	0.03	...	...	...
17	0.01	0.17	0.69	0.53	...	0.03	...	0.18	...	...	...	...
18	...	...	...	0.83	0.07	...	0.06	3.80	0.03	...	0.73	...
19	...	...	...	0.06	1.24	...	...	...	...	0.305	...	0.04
20	0.02	0.18	...	...	0.01	...	...	...	...	...	0.28	...
21	...	...	0.09	...	...	...	...	...	...	...	...	...
22	...	...	...	...	0.24	...	...	...	0.03	0.02	...	0.72
23	0.02	...	0.93	...	...	...	0.16	...	...	0.05	...	...
24	...	...	...	...	...	...	...	...	0.30	...	0.055	0.55
25	...	0.48	...	0.03	...	...	...	0.295	...	...	...	...
26	...	0.55	...	...	...	0.20	...	...	...	...	...	0.02
27	0.01	...	1.03	...	...	...	0.895	...	...	...	...	...
28	...	...	0.06	0.55	0.06	0.21	...	...	...	0.37	...	...
29	...	...	...	0.91	...	0.645	0.02	0.10	...	...	0.52	0.16
30	...	...	0.21	0.13	...	...	...	...	...	...	...	...
31	...	...	0.07	...	...	...	...	...	...	...	...	0.57
Totals	1.32	2.73	3.52	4.645	1.86	3.985	2.385	5.485	1.60	0.765	2.765	3.74

Total for the year . . . . . 35.30 inches.

Being an average of two gauges, located at Mystic Lake and Mystic Station.

Table showing the Rainfall (in inches and hundredths) at Various Places in Eastern Massachusetts, for the year 1879.

	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Totals.
Lake Cochituate	2.00	3.05	3.90	4.69	1.20	4.14	3.38	6.43	1.74	0.90	2.98	3.60	38.01
Framingham	2.56	3.76	4.47	4.58	1.46	3.25	3.61	6.16	1.68	0.86	2.61	4.83	39.83
Southboro'	2.27	3.79	5.685	4.95	1.46	3.61	4.44	6.75	2.30	0.67	2.40	4.41	42.735
Marlboro'	1.77	3.17	5.255	4.38	2.495	4.025	4.175	6.915	1.91	0.915	3.16	4.54	42.71
Westboro'	2.53	3.31	5.21	4.92	1.27	4.18	3.81	6.57	1.88	0.76	2.54	4.04	41.02
Hopkinton	3.26	3.78	5.08	4.75	1.21	3.88	3.63	6.15	1.62	0.84	2.70	3.90	40.80
Chestnut-Hill Reservoir	2.10	3.02	3.565	6.015	1.20	4.77	3.03	7.15	1.88	0.77	2.71	3.93	40.14
Waltham (Boston Manufacturing Co.)	0.99	1.88	3.06	4.59	1.00	3.61	3.17	5.56	1.71	0.70	2.67	2.93	31.86
Cambridge (Observatory)	2.20	3.43	4.02	5.65	1.28	4.59	2.64	5.79	1.71	0.76	3.18	2.75	38.00
Lowell (Locks and Canals Co.)	2.47	3.76	5.01	4.03	2.28	5.71	4.38	6.18	2.17	1.43	3.36	4.47	45.25
Lowell (Merrimack Co.)	2.30	3.80	5.18	3.86	1.84	5.72	4.13	5.62	2.28	1.35	3.20	4.42	43.70
Mystic Lake	1.77	2.69	3.37	4.54	1.92	3.92	2.46	5.39	1.55	0.77	2.73	3.70	34.81
Mystic Engine House	2.05	2.74	3.50	5.02	1.99	4.66	2.69	5.37	1.73	0.68	2.75	3.75	36.93
Mystic Station	1.87	2.76	3.68	4.75	1.80	4.05	2.31	5.58	1.65	0.76	2.80	3.78	35.79
Beacon-Hill Reservoir	2.46	2.50	3.64	5.57	1.21	5.655	2.415	5.015	1.99	1.38	2.975	3.60	38.41
Boston (Supt. of Sewers)	2.74	3.54	4.31	6.97	1.16	5.62	3.43	6.45	1.86	0.80	3.53	4.64	45.05
Boston (U.S. Signal Service)	2.79	4.35	3.90	6.54	0.97	6.24	3.09	6.71	1.84	0.91	2.97	5.36	45.67
Averages	2.24	3.25	4.28	5.05	1.51	4.56	3.36	6.16	1.85	0.90	2.84	4.04	40.04

Table showing the Amount of Evaporation at Chestnut-Hill Reservoir and the Temperature of Air and Water at different Stations on the Water Works.

1879.	EVAPORATION IN INCHES.		TEMPERATURE OF AIR.						TEMP. OF WATER.	
	Chestnut-Hill Reservoir.		Chestnut-Hill Reservoir.			Parker-Hill Reservoir.			B'line Res.	Mystic E.H.
	Wooden Tank.	Tin Tank.	Maximum.	Minimum.	Mean.	Maximum.	Minimum.	Mean.	Mean.	Mean.
January . . .	. . . .	. . . .	48	-9	22	49	-2	21	34	33
February . . .	. . . .	. . . .	52	2	24	47	5	22	35	34
March	. . . .	. . . .	54	6	30	53	6	31	36	34
April	. . . .	. . . .	73	20	42	68	18	42	37	36
May	5.59	6.30	92	36	61	87	37	60	50	53
June	5.54	6.50	94	43	65	90	43	63	65	64
July	6.41	7.75	91	44	71	89	49	69	71	70
August	5.33	6.72	92	48	68	91	50	68	69	67
September . .	3.80	5.33	87	31	61	84	35	60	62	62
October	2.99	4.36	83	20	57	82	24	56	51	52
November . .	. . . .	. . . .	68	7	38	66	8	38	40	40
December . . .	. . . .	. . . .	61	3	32	59	0	32	35	34

WATER REGISTRAR'S REPORT, 1880.

OFFICE OF THE WATER REGISTRAR,
CITY HALL, BOSTON, May 1, 1880.

L. R. CUTTER, ESQ.,
Chairman of the Boston Water Board: —

SIR, — The Water Registrar, in compliance with the requirements of the ordinances, herewith presents his annual report for the year ending with April 30, 1880.

The total number of water-takers now entered for the year 1880 is 52,268, being an increase since January 1, 1879, of 745.

The total number of cases where the water has been turned off for non-payment of rates during the year is 1,367; of this number 1,004 have been turned on, leaving a balance of 363 still remaining off.

The total revenue received from the sale of water on account of the year ending April 30, 1880, is		$968,540 73
From the sale of water furnished in previous years		57,067 09
From the Mystic Department for Cochituate water furnished East Boston from July 23 to December 24, 1879		19,172 70
Total		$1,044,780 52
The total revenue received from East Boston for the year is	$67,559 80	
Of this amount there has been paid to the Mystic Department, as per contract	44,013 24	
In addition to the above there has been received for turning on water, in cases where it had been turned off for non-payment of rates, the sum of		1,988 00
Received for summons		1,624 25
Total		$1,048,392 77

The estimated amount of income from the sale of water during the year ending April 30, 1881	$970,000 00
The expenditures of my office during the year 1879 have been	$23,921 77

METERS.

The total number of meters now attached to the premises of water-takers is 1,097.

Of this number 680 are $\frac{5}{8}$-inch; 348 1-inch; 47 2-inch; 18 3-inch; 4 4-inch sizes.

In addition there are 157 elevators and 40 motors, with indicators attached, to determine the quantity of water consumed.

The following table exhibits the class of premises to which meters are attached, together with the amount of revenue received during the year: —

Name.	Class.	5-8 inch.	1 inch.	2 inch.	3 inch.	4 inch.	Indicator.	Total.	Gallons.	Revenue.
Revere House	Hotel	..	3	..	..	..	1	4	6,411,114	$1,364 81
American House	"	2	1	1	..	..	..	4	9,806,108	2,074 53
Parker House	"	1	4	..	..	..	..	5	10,361,328	2,198 87
U. S. Hotel	"	..	3	..	..	..	2	5	7,868,364	1,682 18
Tremont House	"	2	3	..	..	..	..	5	8,849,379	1,874 56
Young's Hotel	"	2	2	..	..	..	1	5	12,035,993	2,534 35
Adams House	"	2	1	..	..	..	1	4	6,889,508	1,465 43
Hotel Berkeley	"	..	1	1	..	..	..	2	2,668,891	573 57
Albion Building	"	..	1	..	..	..	..	1	1,751,033	374 37
Hotel Pelham	"	1	3	..	..	..	..	4	1,732,112	366 72
Hotel Boylston	"	..	1	..	..	..	1	2	2,948,941	618 77
La Grange House	"	1	1	..	..	..	..	2	394,787	83 50
St. Cloud	"	2	..	..	..	..	2	4	1,231,204	274 81
Hotel Clarendon	"	..	1	..	..	..	1	2	1,498,884	322 68
Seaver House	"	1	..	..	..	..	..	1	263,676	55 29
Evans House	"	..	2	..	..	..	..	2	1,021,013	218 84
Park-square Hotel	"	1	..	..	..	..	..	1	302,641	62 77
Hotel Kempton	"	1	1	..	..	..	1	3	1,289,273	276 19
Hotel Hamilton	"	1	1	..	..	..	1	3	1,410,909	304 08
Hotel Vendome	"	..	1	..	..	..	2	3	2,295,634	514 92
Coolidge House	"	..	5	..	..	..	2	7	1,648,637	345 83
Hancock House	"	1	..	..	..	..	..	1	155,559	31 10
Merrimac House	"	1	..	..	..	..	..	1	223,966	47 80
Stanley House	"	2	..	..	..	..	..	2	404,416	86 87
Amount car'd forw'd.		..	..	..	..	..	..	..	83,513,370	$17,752 84

Name.	Class.	5-8 inch.	1 inch.	2 inch.	3 inch.	4 inch.	Indicator.	Total.	Gallons.	Revenue.
Amount br't forw'd ..	.....	..	..	..	..	..	..	..	83,513,370	$17,752 84
International Hotel ..	Hotel ..	..	1	..	..	..	1	2	2,531,583	533 68
Hotel Alexander.....	" ..	..	1	..	..	..	1	2	1,488,339	316 52
Hotel Brunswick	" ..	..	3	..	..	..	..	3	7,745,881	1,658 17
Park's Hotel	" ..	2	..	..	..	..	..	2	521,866	110 77
Derby House	" ..	3	..	..	..	..	..	3	455,341	96 65
City Hotel	" ..	1	..	..	..	..	..	1	331,043	68 32
Hotel Albermarle....	" ..	..	1	..	..	..	..	1	897,728	191 91
Ashland House.....	" ..	..	1	..	..	..	..	1	451,674	95 19
Hotel Columbus.....	" ..	..	1	..	..	..	1	2	2,153,055	456 70
Hotel Glover.....	" ..	..	1	..	..	..	2	3	692,858	147 42
Merchants' Hotel....	" ..	1	..	..	..	..	..	1	170,693	36 53
M. J. Flatley	" ..	1	..	..	..	..	..	1	124,238	26 19
New England House	" ..	..	1	..	..	..	..	1	783,032	165 19
Winthrop House	" ..	1	..	..	..	..	..	1	572,098	120 71
Dooley's Hotel	" ..	1	..	..	..	..	..	1	97,876	21 03
Falmouth House	" ..	2	..	..	..	..	..	2	317,101	67 43
Job A. Turner	" ..	..	1	..	..	..	..	1	264,759	56 41
Milliken House.....	" ..	3	..	..	..	..	..	3	448,059	95 72
Bell's Hotel.....	" ..	1	2	..	..	..	..	3	1,775,349	380 30
Everett House	" ..	..	1	..	..	..	..	1	195,377	41 07
Metropolitan House..	" ..	..	2	..	..	..	..	2	1,715,732	365 27
Commonwealth Hotel	" ..	..	1	..	..	..	1	2	2,513,326	527 12
St. James Hotel	" ..	..	3	..	..	..	..	3	2,950,133	629 32
Massachusetts House,	" ..	1	..	..	..	..	..	1	97,575	20 60
Bay State House	" ..	1	1	..	..	..	..	2	493,291	107 32
Mariner's House.....	" ..	1	..	..	..	..	..	1	297,945	61 86
Amount car'd forw'd.	.....	..	..	..	..	..	..	..	113,599,322	$24,150 24

Name.	Class.	5-8 inch.	1 inch.	2 inch.	3 inch.	4 inch.	Indicator.	Total.	Gallons.	Revenue.
Amount br't for'wd ..	.....	..	..	..	..	..	..	..	113,599,322	$24,150 24
Robertson House	Hotel ..	2	..	..	..	..	..	2	197,221	42 63
Boston Hotel.....	" ..	1	..	..	..	..	..	1	255,055	54 62
Creighton House.....	" ..	2	1	..	..	..	2	5	4,517,791	959 97
Van Rensselaer	" ..	..	2	..	..	..	..	2	531,046	114 11
Quincy House.....	" ..	3	2	..	..	..	..	5	2,072,154	438 20
Marston House.....	" ..	1	..	..	..	..	..	1	754,869	160 02
Crawford House.....	" ..	2	1	..	..	..	..	3	2,992,591	638 36
Pavilion House.....	" ..	..	1	..	..	..	..	1	651,638	137 81
Norfolk House	" ..	1	..	..	..	..	..	1	637,366	136 40
Hampton House	" ..	..	1	..	..	..	..	1	550,779	120 73
Hotel Agassiz	" ..	..	1	..	..	..	2	3	1,945,253	421 15
Phillips House	" ..	1	..	..	..	..	..	1	97,006	20 09
Albany House.....	" ..	..	1	..	..	..	..	1	325,493	69 96
Cattle Fair Hotel	" ..	..	1	..	..	..	..	1	330,271	68 07
Phœnix House	" ..	1	..	..	..	..	..	1	266,514	55 63
Hotel Huntington....	" ..	..	1	..	..	..	..	1	1,204,861	256 42
Hotel Cluny.....	" ..	..	1	..	..	..	3	4	3,559,374	765 65
Stinson House.....	" ..	1	..	..	..	..	..	1	216,210	45 62
John D. Miller	" ..	2	..	..	..	..	..	2	229,223	49 07
Moody Merrill	" ..	1	1	..	..	..	..	2	1,649,386	350 15
New Marlboro' Hotel.	" ..	3	..	..	..	..	..	3	307,094	63 61
Hotel Hoffman	" ..	..	..	2	..	..	..	2	280,506	56 09
Geo. W. Marks & Co.	" ..	1	..	..	..	..	..	1	16,038	3 20
Hotel Bristol (3 mo.)	" ..	..	2	..	..	..	4	6	414,203	82 84
Old Colony and Newport Railroad Co...	.....	5	4	2	..	..	..	11	23,057,672	4,888 36
Amount car'd forw'd.	.....	..	..	..	..	..	..	..	160,658,936	$34,149 00

Name.	Class.	5-8 inch.	1 inch.	2 inch.	3 inch.	4 inch.	Indicator.	Total.	Gallons.	Revenue.
Amount br't forw'd ..	.....	..	..	..	..	..	..	..	160,658,936	$34,149 00
Boston and Albany Railroad Co.	.....	17	8	3	..	..	..	28	36,674,772	7,779 74
Boston and Maine Railroad Co.	.....	1	3	..	..	..	..	4	5,317,411	1,122 15
Boston and Lowell Railroad Co.	.....	..	3	1	..	..	1	5	6,121,141	1,296 17
Fitchburg Railroad Co.	.....	..	3	..	..	..	..	3	5,326,502	1,119 17
Eastern Railroad Co..	.....	1	2	1	..	..	..	4	6,850,061	1,444 52
New York and New England R.R. Co.	.....	..	1	..	2	..	..	3	15,561,842	3,297 38
Boston and Providence Railroad Co.	.....	3	2	3	..	..	..	8	16,411,382	3,460 54
Boston, Revere Beach, and Lynn R.R. Co.	.....	..	..	2	1	..	..	3	4,990,433	1,051 55
Boston, Winthrop and Pt. Shirley R.R. Co.	.....	..	1	..	..	..	..	1	296,625	62 04
Boston Gas Light Co.	.....	1	3	2	..	1	..	7	30,242,279	6,523 14
So. Boston Gas L't Co.	.....	1	1	..	..	..	..	2	810,302	174 91
E. Boston Gas L't Co.	.....	..	1	..	..	..	..	1	1,176,390	250 27
Roxbury Gas L't Co..	.....	2	1	..	..	..	..	3	990,728	422 42
Dorchester Gas L't Co.	.....	..	1	..	..	..	..	1	557,979	117 23
Standard Sugar Refinery	.....	1	..	..	1	1	..	3	64,091,349	13,653 13
Jasper Sugar Refinery	.....	..	1	1	..	..	..	2	64,230	15 37
Continental Sugar Refinery	.....	..	..	2	..	..	..	2	23,867,250	4,976 55
Bay State Sugar Refinery	.....	..	..	2	..	..	..	2	14,934,300	3,053 97
Oxnard Sugar Refinery.....	.....	..	3	..	..	..	..	3	3,392,013	683 64
Boston Sugar Refinery	.....	..	..	..	1	..	..	1	181,850	25 12
Bay State Rolling Mill	.....	..	3	2	1	..	..	6	17,780,417	3,646 33
Amount car'd forw'd.	.....	..	..	..	..	..	..	..	416,298,192	$88,324 34

Name.	Class.	5-8 inch.	1 inch.	2 inch.	3 inch.	4 inch.	Indicator.	Total.	Gallons.	Revenue.
Amount br't forw'd	.....	..	..	..	..	..	..	..	416,298,192	$88,324 34
Norway Iron Works	.....	1	6	2	..	..	..	9	25,200,308	5,347 42
Highland Spring Brewery	Brewery	.	1	2	..	..	..	3	5,617,575	1,198 28
Edward Habich	"	..	1	..	..	..	..	1	2,869,269	612 03
J. W. Kenney	"	..	1	..	..	..	..	1	1,469,634	305 76
King & Lang	"	..	1	..	..	..	..	1	161,355	40 34
H. & J. Pfaff	"	..	..	1	..	..	..	1	5,641,725	1,191 73
Marshall Brewery	"	..	..	1	..	..	..	1	730,614	148 52
A. J. Houghton & Co., Hallock st.	"	..	1	..	..	..	..	1	960,819	198 68
A. J. Houghton & Co., Station st.	"	..	1	..	..	..	..	1	1,870,982	386 44
Boylston Brewery	"	..	2	..	..	..	..	2	2,215,110	463 09
Gottleib Burkhardt	"	..	1	..	..	..	..	1	633,939	137 89
John Roessle	"	..	..	1	..	..	..	1	8,082,825	1,701 16
Jones, Cook, & Co.	"	1	..	1	..	..	..	2	7,033,448	1,484 05
Boston Beer Co.	"	..	2	..	..	..	..	2	5,966,018	1,256 45
Conrad Decker	"	..	1	..	..	..	..	1	1,081,621	230 81
Suffolk Brewing Co.	"	..	..	1	..	..	..	1	6,257,625	1,322 17
Burton Brewery	"	..	1	..	..	..	..	1	660,750	138 85
Elmwood Spring Brewery	"	..	1	..	..	..	..	1	841,006	179 65
Vincent & Hathaway.	Beer Factory.	..	1	..	..	..	..	1	471,016	97 64
Moses Fairbanks & Co.	"	..	1	..	..	..	..	1	729,939	149 99
Coburn, Lang, & Co.	"	1	..	..	..	..	..	1	273,511	56 68
Comstock, Gove, & Co.	"	1	..	..	..	..	..	1	269,574	55 77
Isaac Pratt, Jr.	Building	1	1	..	..	..	..	2	1,057,208	221 50
Amount car'd forw'd	.....	..	..	..	..	..	..	..	496,394,063	$105,249 24

Name.	Class.	5.8 inch.	1 inch.	2 inch.	3 inch.	4 inch.	Indicator.	Total.	Gallons.	Revenue.
Amount br't forw'd ..	.....	..	..	..	..	..	..	..	496,394,063	$105,249 24
Wesleyan Association	Building	3	..	..	..	..	..	3	437,138	93 23
Tremont Temple	"	1	1	..	..	..	..	2	1,185,182	253 84
S. S. Houghton & Co.	"	1	..	..	..	..	..	1	461,176	97 24
P. McAleer	"	2	..	..	..	..	..	2	240,458	53 55
Smith & Porter.....	"	2	..	..	..	..	..	2	579,976	123 00
F. A. Dewson.....	"	2	..	..	..	..	..	2	1,021,711	215 20
Boston Journal.....	"	..	1	..	..	..	..	1	1,193,993	256 09
Joseph Byers.....	"	2	..	..	..	..	..	2	714,489	150 99
N.E. Mut. Life Ins. Co., 70 State st. ...	"	2	..	..	..	..	..	2	105,916	22 21
N.E. Mut. Life Ins. Co., Milk st.	"	1	1	..	..	..	..	2	897,549	196 59
Horticultural Hall...	"	..	1	..	..	..	..	1	249,429	53 35
Suffolk National B'k	"	2	1	..	..	..	..	3	187,637	38 19
Benjamin Leeds.....	"	2	..	..	..	..	..	2	282,406	60 48
Blackstone Market...	"	2	..	..	..	..	..	2	174,391	36 24
John Rayner heirs ..	"	2	..	..	..	..	..	2	227,476	47 27
Hill & Towne	"	2	..	..	..	..	..	2	193,621	41 18
Turn Hall	"	..	1	..	..	..	..	1	562,109	122 28
B. B. Appleton heirs	"	1	..	..	..	..	..	1	358,389	81 85
J. W. Merriam.....	"	2	..	..	..	..	..	2	239,048	49 24
Peter B. Brigham....	"	2	..	..	..	..	..	2	453,466	96 65
Mrs. Ellen Brooks...	"	1	..	..	..	..	..	1	87,181	18 66
Oriental Tea Company	"	1	..	..	..	..	..	1	292,695	61 67
S. D. Hicks.....	"	1	1	..	..	..	..	2	1,831,269	383 00
John Stetson.....	"	..	1	..	..	..	..	1	835,358	179 59
Macullar, Parker, & Co.	"	..	1	..	..	..	..	1	465,991	98 69
Amount car'd forw'd.	.....	..	..	..	..	..	..	..	509,672,117	$108,079 52

Name.	Class.	5-8 inch.	1 inch.	2 inch.	3 inch.	4 inch.	Indicator.	Total.	Gallons.	Revenue.
Amount br't forw'd ..	.....	..	..	..	..	..	..	..	509,672,117	$108,079 52
John F. Mills	Building	1	..	..	..	..	..	1	459,054	95 76
Lilly & Brackett.....	"	..	1	..	..	..	..	1	2,110,804	457 45
J. I. Brown & Son...	"	..	1	..	..	..	..	1	288,737	63 35
Hogg, Brown, & Taylor	"	1	1	..	..	..	1	3	3,146,206	667 93
A. Wentworth.....	"	2	..	..	..	..	..	2	282,901	59 72
William Ropes, estate	"	4	1	..	..	..	..	5	2,576,297	549 05
A. D. Puffer	"	1	..	..	..	..	..	1	490,096	104 35
J. R. Hall	"	..	1	..	..	..	..	1	564,518	119 22
Grand Lodge of Masons	"	1	1	..	..	..	..	2	216,351	68 84
James W. Rollins....	"	1	..	..	..	..	..	1	620,303	132 37
Haley, Morse, & Co..	"	2	..	..	..	..	..	2	76,156	15 78
Mass. Inst. of Technology.....	"	..	2	..	..	..	..	2	1,116,879	242 66
S. N. Brown, jr.	"	1	..	..	..	..	..	1	334,051	70 24
A. H. Vinton.....	"	1	..	..	..	..	..	1	131,761	27 96
A. Stowell.....	"	1	..	..	..	..	..	1	216,346	47 07
B. F. Bradbury.....	"	1	..	..	..	..	..	1	134,355	27 94
Shepard, Norwell, & Co.	"	4	..	..	..	..	..	4	363,541	76 79
D. J. Hastings	"	..	1	..	..	..	..	1	345,834	71 25
C. U. Cotting, 628 Washington st.....	"	5	..	..	..	..	..	5	531,249	114 77
C. U. Cotting, 7 Court sq.	"	1	1	..	..	..	..	2	77,341	17 24
W. H. Mann.....	"	2	..	..	..	..	..	2	Vacant.	
Moulton & Bradley ..	"	1	..	..	..	..	..	1	1,984,554	396 89
Jordan, Marsh, & Co., Washington street.	"	2	3	..	..	..	..	5	1,338,098	275 65
Amount car'd forw'd.		..	..	..	..	..	..	..	527,077,549	$111,781 80

Name.	Class.	5-8 inch.	1 inch.	2 inch.	3 inch.	4 inch.	Indicator.	Total.	Gallons.	Revenue.
Amount br't forw'd ..	.....	..	..	..	..	..	..	..	527,077,549	$111,781 80
G. T. Burnham & Co.	Building	..	1	..	..	..	..	1	756,391	160 71
Stephen H. Bennett heirs	"	2	..	..	..	..	..	2	649,044	143 96
W. H. Foster	"	1	..	..	..	..	..	1	245,351	51 87
Brown & Seavey.....	"	1	..	..	..	..	..	1	89,521	18 83
Franklin Evans.....	"	1	..	..	..	..	..	1	168,407	35 29
J. Zane & Co.....	"	2	..	..	..	..	..	2	209,634	44 02
Allen & Woodworth..		1	..	..	..	..	..	1	185,071	39 23
Merchants' Exchange	"	1	1	..	..	..	1	3	4,558,554	958 02
H. M. Burr & Co.....	"	2	..	..	..	..	..	2	186,218	39 10
J. T. Brown & Co. ..	"	1	..	..	..	..	..	1	198,330	41 68
J. C. Gray	"	3	1	..	..	..	..	4	404,821	85 60
C. F. Hovey & Co. ..	"	3	1	..	..	..	..	4	1,122,114	236 96
Globe Publishing House	"	1	..	..	..	..	..	1	717,056	153 64
Charles Rollins.....	"	..	1	..	..	..	..	1	1,216,561	253 66
Adams Express Co. ..	"	2	1	..	..	..	..	3	515,139	109 69
A. J. Wright.....	"	..	1	..	..	..	..	1	1,142,446	251 64
W. Blenkinsop.....	"	2	..	..	..	..	..	2	292,696	62 28
Boston Gas Light Co.	"	2	..	..	..	..	..	2	115,217	24 29
John F. Wilson	"	1	..	..	..	..	..	1	269,746	57 39
L. P. Ober.....	"	1	..	..	..	..	..	1	440,633	92 24
Young Men's Christian Association ...	"	1	..	..	..	..	..	1	220,621	48 09
A. A. Miner	"	1	..	..	..	..	..	1	168,886	36 04
Henry F. Miller	"	..	1	..	..	..	..	1	321,203	68 63
Art Building	"	..	1	..	..	..	..	1	253,036	55 54
Equitable Life Ins. Co.	"	1	1	..	..	..	..	2	1,017,661	219 40
Amount car'd forw'd.		..	..	..	..	..	..	..	542,541,906	$115,069 60

Name.	Class.	5-8 inch.	1 inch.	2 inch.	3 inch.	4 inch.	Indicator.	Total.	Gallons.	Revenue.
Amount br't forw'd ..	.....	..	..	..	..	..	..	..	542,541,906	$115,069 60
R. H. White & Co. ..	Building	1	1	..	..	..	..	2	1,792,495	379 68
Young Men's Christian Union	"	1	1	..	..	..	..	2	1,961,484	419 90
W. R. Clark	"	1	..	..	..	..	..	1	420,961	90 34
Deacon House	"	1	..	..	..	..	..	1	89,068	18 11
Boston Herald Building	"	3	..	..	..	..	..	3	3,160,981	669 68
Loring & Dexter, Trust.....	"	2	..	..	..	..	..	2	641,874	135 26
Commonwealth Building.....	"	..	1	..	..	..	..	1	842,664	175 33
Mutual Life Ins. Co. of N.Y.	"	..	..	1	..	..	..	1	671,625	142 57
F. Tudor	"	3	..	..	..	..	..	3	1,045,847	224 07
Studio Building.....	.....	..	1	..	..	..	..	1	593,491	126 54
Boston Post Building	.....	..	1	..	..	..	..	1	857,626	180 82
Traveller Building...	.....	2	1	..	..	..	..	3	594,616	127 35
Union Building.....	.....	5	..	..	..	..	..	5	1,126,838	235 62
Wentworth Building.	.....	1	..	..	..	..	..	1	311,439	66 70
Rice Building	.....	..	1	..	..	..	..	1	542,183	114 28
Carter Building	.....	2	..	..	..	..	..	2	161,394	34 62
Edmands Building...	.....	1	..	..	..	..	..	1	357,541	74 34
Washington Building	.....	3	..	..	..	..	..	3	807,961	169 58
Niles Building.....	.....	..	2	..	..	..	..	2	1,080,930	227 58
Palmer's Building ...	.....	1	..	..	..	.	..	1	129,001	28 17
Joy's Building.....	.....	3	..	..	..	..	..	3	413,939	86 40
Joshua M. Sears, 199 Washington street .	.....	2	1	..	..	..	..	3	999,954	214 65
Advertiser Building	.....	..	1	..	..	..	..	1	950,581	210 12
Amount car'd forw'd.	.....	..	..	..	..	..	..	..	562,096,399	$119,221 41

Name.	Class.	5-8 inch.	1 inch.	2 inch.	3 inch.	4 inch.	Indicator.	Total.	Gallons.	Revenue.
Amount br't forw'd ..	.....	..	..	..	..	..	..	..	562,096,399	$119,221 31
Charity Building	.....	2	..	..	..	..	..	2	324,594	70 13
Codman Building	.....	7	..	..	..	..	..	7	877,111	182 82
Transcript Building..	.....	1	1	..	..	..	..	2	580,328	123 74
Merchants' Bank Building	.....	1	1	..	..	..	..	2	1,424,957	303 51
Paine Memorial Hall.	.....	..	1	..	..	..	..	1	225,188	47 54
Chauncy Hall School	.....	1	..	..	..	..	..	1	121,703	26 65
Mass. General Hospital	.....	3	4	1	..	..	..	8	6,864,758	1,531 31
City Hospital.....	.....	1	7	..	..	..	..	8	9,896,492	2,102 04
Lunatic Hospital	.....	1	3	..	..	..	..	4	4,200,504	892 80
New England Hospital	.....	1	..	..	..	..	..	1	898,111	189 54
Mass. Homœopathic Hospital	.....	1	..	..	..	..	..	1	417,646	87 46
Notre Dame Academy	.....	1	..	..	..	..	..	1	385,014	79 28
House of the Good Shepherd (3 months)	.....	1	..	..	..	..	..	1	450,061	96 16
Church Home	.....	..	1	..	..	..	..	1	838,074	176 36
Sailors' Home.....	.....	..	1	..	..	..	..	1	104,566	24 54
Temporary Home....	.....	1	..	..	..	..	..	1	403,816	86 78
Somerset Club	.....	2	..	..	..	..	..	2	1,546,950	330 31
Union Club	.....	1	..	..	..	..	..	1	821,889	174 12
Temple Club.....	.....	..	1	..	..	..	..	1	134,731	28 80
Central Club	.....	1	..	..	..	..	..	1	30,909	6 64
Boston Music Hall...	.....	3	..	..	..	..	..	3	398,198	87 44
N.E. Conservatory of Music	.....	1	..	..	..	..	..	1	79,128	19 81
Park Theatre.....	.....	1	..	..	..	..	..	1	252,856	55 09
City Hall	.....	1	2	..	..	..	..	3	2,459,236	520 02
Amount br't forw'd ..	.....	..	..	..	..	..	..	..	595,833,219	$126,464 20

Name.	Class.	5-8 inch.	1 inch.	2 inch.	3 inch.	4 inch.	Indicator.	Totals.	Gallons.	Revenue.
Amount car'd forw'd.	.....	..	..	..	..	..	..	..	595,833,219	$126,464 20
State of Massachusetts	StateHo.	2	1	..	..	..	..	3	2,287,613	484 00
United States	Post Office.	..	..	1	..	..	..	1	1,415,475	305 23
Howard Athenæum ..	.....	1	..	..	..	..	..	1	75,336	16 68
Boston Theatre.....	.....	..	2	..	..	..	..	2	585,294	126 62
Globe Theatre.....	.....	4	..	..	..	..	..	4	503,724	109 17
Boylston Market.....	.....	5	..	..	..	..	..	5	548,701	115 50
Washington Market..	.....	2	1	..	..	..	..	3	413,063	86 78
Suffolk Market.....	.....	4	..	..	..	..	..	4	334,456	70 25
Franklin Market	.....	..	1	..	..	..	..	1	291,908	66 57
Williams Market	.....	3	..	..	..	..	..	3	259,148	58 11
Medical College	.....	..	1	..	..	..	..	1	610,449	128 28
Boston College	.....	1	1	..	..	..	..	2	412,561	89 09
Mrs. C. C. Annable..	Board'g.	3	..	..	..	..	1	4	763,411	159 02
Mrs. W. A. Colson ..	"	2	..	..	..	..	..	2	235,456	51 28
Charles W. Smith ...	"	2	..	..	..	..	..	2	179,769	38 41
M. P. Carr.....	"	1	..	..	..	..	..	1	200,266	42 15
J. H. Grout.....	"	1	..	..	..	..	..	1	317,006	66 71
George Odin heirs ...	"	1	..	..	..	..	..	1	110 948	23 36
James F. Goodwin...	"	2	..	..	..	..	..	2	389,446	82 38
Mrs. D. L. Morse....	"	1	..	..	..	..	..	1	230,529	50 04
Mrs. C. Farley	"	1	..	..	..	..	..	1	102,128	22 16
Mrs. C. Cummings...	"	1	..	..	..	..	..	1	228,398	50 11
James Knowlton.....	"	1	1	..	..	..	..	2	799,418	169 62
Ruel Philbrook.....	"	2	..	..	..	..	..	2	334,412	73 11
J. A. Merrill.....	"	..	1	..	..	..	..	1	390,399	82 44
Mrs. G. A. Winn....	"	1	..	..	..	..	..	1	112,530	24 74
Amount car'd forw'd.	.....	..	..	..	..	..	..	..	607,965,063	$129,056 01

Name.	Class.	5-8 inch.	1 inch.	2 inch.	3 inch.	4 inch.	Indicator.	Total.	Gallons.	Revenue.
Amount br't forw'd ..	.....	..	..	..	..	..	..	..	607,965,063	$129,056 01
Mrs. N. F. Chapin...	Board'g.	1	..	..	..	..	..	1	127,254	27 10
William Evans	Model ..	3	..	..	..	..	..	3	302,918	63 56
M. H. Abbott, 215 Kneeland st.	"	2	..	..	..	..	..	2	178,989	38 96
E. Cutler, 224 Kneeland st.....	"	2	..	..	..	..	..	2	141,639	29 94
Michael Doherty	"	4	..	..	..	..	..	4	300,758	64 08
Job A. Turner	"	1	..	..	..	..	..	1	66,534	14 47
James Chisholm.....	"	1	..	..	..	..	..	1	171,023	36 13
J. Collins.....	"	2	..	..	..	..	..	2	244,478	51 82
D. L. Webster	"	1	..	..	..	..	1	2	1,152,324	246 27
Thomas Cantlon.....	"	1	..	..	..	..	..	1	107,934	22 75
W. B. Mendum.....	"	2	..	..	..	..	..	2	236,799	48 16
Lowell Five-Cent Savings Bank	"	..	1	..	..	..	..	1	892,493	193 64
N. Whiting	"	..	1	..	..	..	..	1	559,568	122 16
David Wilcox & Co., 8 Boylston square.	Factory.	3	..	..	..	..	..	3	1,214,693	256 62
J. Morrill, Jr., & Co.	"	1	..	..	..	..	..	..	105,174	22 56
Pearson Cordage Co.	"	..	1	..	..	..	..	1	1,510,973	317 23
J. Morse.....	"	1	..	..	..	..	..	1	147,879	31 60
L. Whittaker.....	"	1	..	..	..	..	..	1	122,603	25 91
C. Wright & Co.....	"	1	..	..	..	..	..	1	209,841	43 18
Howard Watch & Clock Co.	"	..	2	..	..	..	..	2	332,409	71 39
Haley, Morse & Co...	"	1	..	..	..	..	..	1	Not using.	
Roxbury Carpet Co...	"	..	1	..	..	..	..	1	3,064,445	658 19
George C. Pearson...	"	1	..	..	..	..	..	1	447,631	94 44
Putnam Nail Co.	"	..	3	..	..	..	..	3	3,756,084	797 90
Amount car'd forw'd.		..	..	..	..	..	..	..	623,359,506	$132,334 07

Name.	Class.	5-8 inch.	1 inch.	2 inch.	3 inch.	4 inch.	Indicator.	Totals.	Gallons.	Revenue.
Amount br't forw'd ..	.....	..	..	..	..	..	..	..	623,359,506	$132,334 07
William Carleton....	Factory.	1	2	..	..	..	..	3	1,055,124	224 08
Murphy, Leavens, & Co.....	"	1	..	..	..	..	..	1	331,584	70 65
H. M. Richards	"	1	..	..	..	..	..	1	371,033	78 19
Charles E. Kershaw..	"	1	..	..	..	..	..	1	Not using.	
E. Strain & Co.....	"	1	..	..	..	..	..	1	133,065	30 97
Peet Valve Co.....	"	..	1	..	..	..	..	1	722,822	151 60
A. W. Bailey.....	"	2	..	..	..	..	..	2	122,222	25 66
C. M. Clapp & Co.....	"	..	1	..	..	..	..	1	314,904	65 88
Pratt Bros.	"	1	..	..	..	..	..	1	543,615	113 71
Byam, Carleton & Co.	"	1	..	..	..	..	..	1	39,278	8 21
Stephen Smith & Co..	"	1	..	..	..	..	..	1	658,126	138 63
Chickering & Sons...	"	..	3	..	..	..	..	3	1,941,526	412 22
Mace & Keys.....	"	1	..	..	..	..	..	1	198,308	42 59
Bagnall & Loud.....	"	1	..	..	..	..	..	1	212,181	45 99
Boston Car Spring Co.	"	..	1	..	..	..	..	1	620,446	131 09
A. Folsom & Sons....	"	..	1	..	..	..	..	1	371,784	79 18
Dwinell, Hayward, & Co.	"	1	..	..	..	..	..	1	637,216	134 61
J. M. Cook, estate...	"	..	1	..	..	..	..	1	1,411,794	297 09
Hallet & Davis	"	..	1	..	..	..	..	1	183,062	39 07
S. D. & H. W. Smith, Montgomery st	"	..	1	..	..	..	..	1	692,355	145 35
S. D. & H. W. Smith, Albany st	"	..	1	..	..	..	..	1	657,893	137 29
Emerson Piano Co...	"	1	..	..	..	..	..	1	242,949	50 11
William Underwood & Co.....	"	2	..	..	..	..	..	2	754,831	158 26
G. D. Dowes & Co...	"	..	1	..	..	..	..	1	625,486	130 26
Amount car'd forw'd.		..	..	..	..	..	..	..	636,201,110	$135,044 76

Name.	Class.	5-8 inch.	1 inch.	2 inch.	3 inch.	4 inch.	Indicator.	Total.	Gallons.	Revenue.
Amount br't forw'd	.....	..	..	..	..	..	..	..	636,201,110	$135,044 76
D. Wilcox & Co., Avery st	Factory.	..	1	..	..	..	..	1	207,106	43 50
C. P. George & Co.	"	1	..	..	..	..	..	1	15,158	3 03
Boston Belting Co.	"	..	1	..	..	..	..	1	375,750	81 64
Richardson, McKee, & Co.	"	1	..	..	..	..	..	1	470,108	100 17
H. Barker	"	..	1	..	..	..	..	1	129,113	27 44
Conrad Zeigler	"	1	..	..	..	..	..	1	45,541	10 63
C. H. Bacon	"	2	..	..	..	..	..	2	1,375,981	292 02
Morton & Chesley	"	..	1	..	..	..	..	1	1,623,121	345 40
A. Zeigler	"	1	..	..	..	..	..	1	19,488	3 88
Cummings & Carlisle	"	..	1	..	..	..	..	1	1,138,291	242 94
Walworth Manufact. Co.	"	1	..	..	..	..	..	1	425,130	90 50
Newton, Morton, & Co.	"	1	..	..	..	..	..	1	314,056	66 11
A. J. Morse & Co.	"	2	..	..	..	..	..	2	398,919	84 11
Seth W. Fowle & Son	"	1	..	..	..	..	..	1	33,807	7 32
H. B. Arnold & Co.	"	1	..	..	..	..	..	1	434,783	94 96
Dennison Manufact. Co., 25 Vale st	"	..	1	..	..	..	..	1	434,506	87 63
Chadwick Lead Works	"	1	..	..	..	..	..	1	419,004	87 04
Henry Mayo & Co.	"	..	2	..	..	..	..	2	575,026	114 99
B. F. Sturtevant	"	1	..	..	..	..	..	1	331,088	69 66
Charles W. Spurr	"	1	..	..	..	..	..	1	177,646	37 80
Hallett & Cumston	"	1	..	..	..	..	..	1	370,959	80 38
P. Lally	"	..	1	..	..	..	..	1	637,104	132 07
S. G. Underhill	"	1	..	..	..	..	..	1	476,214	101 37
Amer. Molded Collar Co.	"	1	..	..	..	..	..	1	488,732	103 53
Amount car'd forw'd.	.....	..	..	..	..	..	..	..	647,117,741	$137,352 88

Name.	Class.	5-8 inch.	1 inch.	2 inch.	3 inch.	4 inch.	Indicator.	Total.	Gallons.	Revenue.
Amount br't forw'd	.....	..	..	..	..	..	..	..	647,117,741	$137,352 88
Kittredge & Co.	Factory.	1	..	..	..	..	..	1	Not using.	
D. Shales & Co.	"	1	..	..	..	..	..	1	371,581	79 64
Christopher Blake	"	1	..	..	..	..	..	1	339,813	72 23
G. H. Dickerman	"	1	..	..	..	..	..	1	512,461	106 57
J. L. Ross	"	2	..	..	..	..	..	2	100,726	23 81
R. Estabrook & Son	"	1	..	..	..	..	..	1	395,843	79 16
George Gill	"	1	..	..	..	..	..	1	168,833	35 28
F. King & Co.	"	1	..	..	..	..	..	1	577,336	122 03
Grover & Baker Sewing Machine Co., Wash. st	"	..	3	..	..	..	..	3	15,000	3 00
Downes & Adams	"	1	..	..	..	..	..	1	201,346	40 82
Jona. Cottle	"	..	1	..	..	..	..	1	561,451	112 27
J.A.Frampton(6mos.)	"	1	..	..	..	..	..	1	113,573	22 70
H. N. Glover (5 mos.)	"	..	1	..	..	..	..	1	284,661	56 92
G. F. Waldron	Mach'ist	1	..	..	..	..	..	1	Vacant.	
A. K. Young	"	2	..	..	..	..	..	2	428,378	90 42
Harrison Loring	"	2	1	..	..	..	..	3	112,321	24 00
S. A. Woods & Co.	"	1	..	..	..	..	..	1	757,576	159 74
George F. Blake	"	..	1	..	..	..	..	1	876,684	192 29
Ashcroft Manufact. Co.	"	1	1	..	..	..	..	2	576,256	121 65
L. M. Ham	"	2	..	..	..	..	..	2	380,574	79 84
Eyelet Tool Co	"	1	..	..	..	..	..	1	211,463	44 73
L. A. Bigelow	"	..	1	..	..	..	..	1	630,121	134 42
William Evans	"	3	1	..	..	..	..	4	884,409	191 11
Smith & Lovett	"	1	..	..	..	..	..	1	181,230	38 27
Am. Tool and Machine Co.	"	..	1	..	..	..	..	1	881,709	188 40
Amount car'd forw'd.	.....	..	..	..	..	..	..	..	656,681,086	$139,372 18

Name.	Class.	5-8 inch.	1 inch.	2 inch.	3 inch.	4 inch.	Indicator.	Total.	Gallons.	Revenue.
Amount br't forw'd ..	.....	..	..	..	..	..	..	..	656,681,086	$139,372 18
J. Souther & Co.	Mach'ist	1	..	..	..	..	..	1	11,138	2 22
Boston Machine Co. .	"	1	1	..	..	..	..	2	1,299,039	274 08
Hersey Brothers.....	"	1	..	..	..	..	..	1	291,241	60 95
Hinckley Locomotive Works	"	1	3	..	..	..	..	4	1,946,476	413 45
Atlantic Works, Chelsea st.	"	..	1	..	..	..	..	1	1,907,761	411 34
Atlantic Works, Border st.	"	..	..	1	..	..	..	1	2,348,550	491 22
Holmes & Blanchard, Charlestown st.	"	..	1	..	..	..	..	1	721,711	154 36
H. S. Robinson.....	"	1	..	..	..	..	..	1	200,049	42 33
Geo. T. McLaughlin .	"	2	..	..	..	..	..	2	612,294	130 07
South Boston Iron Co.	Foundry	3	2	1	..	..	..	6	1,742,971	368 87
Holmes & Blanchard, Taylor st.....	"	1	..	..	..	..	..	1	192,159	40 70
James Gurney & Co..	"	1	..	..	..	..	..	1	137,896	28 52
William Blake & Co..	"	..	1	..	..	..	..	1	577,241	121 01
Whiting Foundry Co.	"	1	..	..	..	..	..	1	379,164	80 33
Tremont Foundry Co.	"	1	..	..	..	..	..	1	38,865	8 31
Fulton Iron Foundry Co.	"	..	1	..	..	..	..	1	149,101	31 20
Charles Roberts	"	..	1	..	..	..	..	1	569,716	120 52
Highland Foundry Co.	"	1	..	..	..	..	..	1	326,513	66 39
M. H. Washburn	"	1	..	..	..	..	..	1	129,279	28 10
George Miles.....	Boil'r'm.	1	..	..	..	..	..	1	333,751	69 51
Downer Kerosine Oil Co.	Oil W'ks	2	1	1	..	..	..	4	9,320,393	1,987 64
S. Jenney & Co.....	"	..	2	..	..	..	..	2	1,109,603	233 24
Maverick Oil Co.....	"	..	1	..	..	..	..	1	1,357,200	286 50
Amount car'd forw'd .	.....	..	..	..	..	..	..	..	682,383,197	$144,823 04

Name.	Class.	5-8 inch.	1 inch.	2 inch.	3 inch.	4 inch.	Indicator.	Total.	Gallons.	Revenue.
Amount br't forw'd ..	.....	..	..	..	..	..	..	..	682,383,197	$144,823 04
Pierce & Canterbury.	Oil W'ks	..	1	..	..	..	..	1	1,240,757	274 20
Kidder, Vaughn, & Co.	"	..	1	..	..	..	..	1	366,181	78 66
Bowker, Torrey, & Co., Bowker st.	Marble Works	1	1	..	..	..	..	2	3,198,331	672 90
Bowker, Torrey, & Co., Foundry st....	"	1	1	..	..	..	..	2	Not using.	
Torreys & Co.....	"	2	1	..	..	..	..	3	2,436,203	518 04
C. E. Hall & Co.	"	2	1	..	..	..	..	3	2,684,573	563 65
A. Wentworth & Co..	"	4	..	..	..	..	..	4	1,987,569	419 14
Richard Power & Son.	"	2	..	..	..	..	..	2	567,256	118 79
Jeremiah Carew	Stone Yd	2	..	..	..	..	..	2	307,404	66 35
E. F. Meaney	"	2	1	..	..	..	..	3	1,621,066	334 18
Geo. F. Chapin & Co.	Vinegar Works	1	..	..	..	..	..	1	174,624	35 84
Pike & Fabins.....	Pickle Factory	..	1	..	..	..	..	1	433,321	92 19
Horace H. Lewis	"	1	..	..	..	..	..	1	178,771	36 93
W. K. Lewis & Bros..	"	1	..	..	..	..	..	1	266,484	56 38
M. M. Pickett & Son.	"	1	..	..	..	..	..	1	189,766	40 15
E. T. Cowdrey & Co..	"	2	..	..	..	..	..	2	780,008	162 37
Warner & Freeman ..	Salt Wks	1	..	..	..	..	..	1	209,987	46 02
Fobes, Hayward, & Co.	Confec'y	1	..	..	..	..	..	1	584,724	123 80
Chase & Co.....	"	1	1	..	..	..	..	2	1,408,569	295 68
A. F. Copeland.....	"	3	..	..	..	..	..	3	676,166	188 34
E. M. Messenger	Restaur't	1	..	..	..	..	..	1	175,674	37 04
Mrs. G. F. Harrington.	"	1	..	..	..	..	..	1	302,371	63 78
Marston & Cunio	"	1	..	..	..	..	..	1	341,364	72 82
W. L. Egerton	"	1	..	..	..	..	..	1	441,841	91 79
Amount car'd forw'd.	.....	..	..	..	..	..	..	..	702,956,207	$149,212 08

Name.	Class.	5-8 inch.	1 inch.	2 inch.	3 inch.	4 inch.	Indicator.	Total.	Gallons.	Revenue.
Amount br't forw'd ..	.....	..	..	..	..	..	..	..	702,956,207	$149,212 08
Frost & Dearborn....	Restaur't	..	1	..	..	..	..	1	455,176	95 38
George Fera	"	1	..	..	..	..	..	1	318,421	67 97
D. T. Copeland.....	"	..	1	..	..	..	..	1	774,039	163 66
F. E. Weber.....	"	1	..	..	..	..	..	1	207,939	44 06
R. B. Brigham	"	1	1	..	..	..	..	2	1,330,771	281 97
W. F. Bacon.....	"	1	..	..	..	..	..	1	123,001	26 41
Thomas Hillery	"	1	..	..	..	..	..	1	195,488	41 65
Campbell & Coverly .	"	1	..	..	..	..	..	1	405,864	86 23
C. T. Somes	"	1	..	..	..	..	..	1	220,876	44 98
O. A. Jones.....	"	1	..	..	..	..	..	1	223,846	47 49
O. S. Edgerly.....	"	1	..	..	..	..	..	1	50,558	10 72
C. H. Bailey	"	1	..	..	..	..	..	1	228,841	48 18
Mary Smith.....	"	1	..	..	..	..	..	1	118,981	27 44
R. M. Waitt	"	1	..	..	..	..	..	1	188,236	39 96
C. E. Bacon	"	1	..	..	..	..	..	1	300,271	63 88
Thomas Walton	"	1	..	..	..	..	..	1	96,504	20 51
J. Gallagher	"	1	..	..	..	..	..	1	84,234	18 33
A. E. Stahl & Co.....	"	1	..	..	..	..	..	1	11,805	2 36
Dearborn & Ingalls ..	"	1	..	..	..	..	..	1	216,781	46 19
A. R. Weir.....	"	1	..	..	..	..	..	1	165,976	35 16
S. A. Clough & Son..	"	1	..	..	..	..	..	1	220,823	47 76
J. W. Saunders	"	1	..	..	..	..	..	1	204,946	42 97
A. F. Copeland.....	"	1	..	..	..	..	..	1	293,068	62 97
J. Backus.....	"	1	..	..	..	..	..	1	387,923	82 16
W. S. Matthews	"	1	..	..	..	..	..	1	237,818	50 45
Brock & Coy, 243 Atlantic ave.....	"	1	..	..	..	..	..	1	179,243	38 91
Amount car'd forw'd .	.....	..	..	..	..	..	..	..	710,197,636	$150,749 83

Name.	Class.	5-8 inch.	1 inch.	2 inch.	3 inch.	4 inch.	Indicator.	Total.	Gallons.	Revenue.
Amount br't forw'd..	.....	..	..	..	..	..	..	..	710,197,636	$150,749 83
Brock & Coy, 73 Clinton	Restaur't	1	..	..	..	..	..	1	226,038	47 18
Sheppard & Chamberlin	"	1	..	..	..	..	..	1	226,817	47 99
Durgin, Park, & Co..	"	1	..	..	..	..	..	1	314,724	66 79
Paul & Savoy	"	1	..	..	..	..	..	1	271,876	57 80
Smith & Underwood .	"	1	..	..	..	..	..	1	628,013	133 62
J. M. Learned	"	1	..	..	..	..	..	1	526,021	111 66
Charles Vossler	"	1	..	..	..	..	..	1	425,837	89 44
Tibbets & Russell....	"	2	..	..	..	..	..	2	430,344	91 71
J. H. Blodgett	"	1	..	..	..	..	..	1	524,281	110 81
R. R. & J. S. Higgins	Saloon .	2	..	..	..	..	..	2	971,552	207 57
Atwood & Bacon	"	1	..	..	..	..	..	1	97,719	20 97
Smith & Wright	"	1	..	..	..	..	..	1	474,496	103 25
Palais Royal	"	1	..	..	..	..	..	1	360,324	73 59
Felton & Son	Distill'y	..	2	..	..	..	..	2	2,221,186	463 50
Jonas H. French	"	..	1	..	..	..	..	1	711,294	146 89
C. H. Graves.....	Rectifier	1	..	..	..	..	..	1	248,191	53 10
James Edmond & Co.	Fire Brick.	1	..	..	..	..	..	1	460,838	100 81
A. Hale & Co.....	Rubber Works.	1	..	..	..	..	..	1	269,896	58 47
Byron & Hall	Currier.	1	..	..	..	..	..	1	280,037	63 71
Byron & Hall, Ellsworth pl.....	"	1	..	..	..	..	..	1	81,331	16 25
W. H. Swift & Co. ..	Fertiliz's	1	1	..	..	..	..	2	1,122,998	234 30
W. L. Bradley	"	..	1	..	..	..	..	1	2,354,116	505 38
W. H. Bowker & Co.	"	..	1	..	..	..	..	1	866,610	184 16
Amount car'd forw'd.	.....	..	..	..	..	..	..	..	724,292,175	$153,738 78

Name.	Class.	5-8 inch.	1 inch.	2 inch.	3 inch.	4 inch.	Indicator.	Total.	Gallons.	Revenue.
Amount br't forw'd	.....	..	..	..	..	..	..	..	724,292,175	$153,738 78
B. Randall	Fertiliz's	1	..	..	..	..	..	1	221,183	50 00
Boston Dye Wood & Chemical Co.	Chemic's	..	3	..	..	..	..	3	14,032,079	2,958 51
W. H. Whitmore	"	..	1	..	..	..	..	1	354,740	94 32
G. W. & F. Appleton	"	1	..	..	..	..	..	1	Not using.	
Preston & Merrill	Extracts	..	..	1	..	..	..	1	620,475	132 89
Quirin & Nelson	Tannery	..	1	..	..	..	..	1	406,816	85 63
F. S. Merritt	"	1	..	..	..	..	..	1	455,559	97 37
R. W. Ames & Son	"	1	..	..	..	..	..	1	Not using.	
James A. Frampton	"	1	..	..	..	..	..	1	156,901	33 56
Boston Forge Co.	.....	..	1	..	..	..	..	1	2,238,332	466 82
Boston Lead Man'f'g Co.	.....	1	1	..	..	..	..	2	433,877	91 24
A. N. Hardy	Pho'pher	1	..	..	..	..	..	1	127,418	27 03
Compressed Shafting Co.	.....	..	1	..	..	..	..	1	52,635	13 16
Suffolk Glass Co.	.....	1	..	..	..	..	..	1	696,751	149 05
Washington Pipe Works	.....	..	1	..	..	..	..	1	Not using.	
New England Pottery	.....	..	1	..	..	..	..	1	463,719	97 53
Simpson's Dry Dock Co.	.....	..	1	..	..	..	..	1	695,304	145 42
Cunard Steamship Co.	.....	..	..	..	1	..	..	1	3,838,725	810 30
Union Freight Railway Co.	.....	..	..	..	1	..	..	1	1,689,900	359 86
W. B. Gleason & Co.	Carving.	1	..	..	..	..	..	1	152,739	32 29
Butchers' Slaughtering and Melting Association	.....	..	1	..	..	..	..	1	3,831,683	817 99
John Giblin	Skating Rink.	1	..	..	..	..	..	1	Not using.	
Amount car'd forw'd.	.....	..	..	..	..	..	..	..	754,761,011	$160,201 75

Name.	Class.	.5 inch.	1 inch.	2 inch.	3 inch.	4 inch.	Indicator.	Total.	Gallons.	Revenue.
Amount br't forw'd ..	.....	..	..	..	..	..	..	..	754,761,011	$160,201 75
Boston Skating Rink Co.....	Skating Rink.	..	1	..	..	..	..	1	200,025	50 00
Metropolitan Railroad Co.....	Stables .	16	6	..	..	..	..	22	9,127,225	1,946 56
So. Boston Railroad Co.....	"	2	3	..	..	..	..	5	4,888,743	1,030 13
Highland Railroad Co.....	"	5	..	..	..	..	..	5	2,965,833	622 15
Draper & Hall	Stable ..	3	..	..	..	..	..	3	999,181	209 22
V. R. Bridgham.....	"	2	..	..	..	..	..	2	346,283	70 92
C. H. Foster	"	1	..	..	..	..	..	1	398,798	84 02
A. J. Child.....	"	1	..	..	..	..	..	1	520,636	106 88
E. A. Noyes	"	..	1	..	..	..	..	1	505,628	104 46
James W. Hale.....	"	1	..	..	..	..	..	1	195,009	40 05
A. H. Foster.....	"	1	..	..	..	..	..	1	30,360	7 59
I. M. Southwick.....	"	1	..	..	..	..	..	1	87,286	17 45
Charles R. Smith	"	2	..	..	..	..	..	2	214,862	44 84
J Austin Rogers	"	1	..	..	..	..	..	1	567,579	119 93
Norfolk House Stable	"	1	..	..	..	..	..	1	Not using.	
Charles Foster & Co.	"	1	..	..	..	..	..	1	274,493	57 24
Parmenter & Sumner	"	1	..	..	..	..	..	1	232,096	50 78
Robert H. Douglas ..	"	1	..	..	..	..	..	1	261,233	54 92
J. Frank Pickett	"	1	..	..	..	..	..	1	82,824	16 96
J. P. Barnard, 108 Chestnut street....	"	1	..	..	..	..	..	1	368,476	79 17
J. P. Barnard, cor. Brimmer and Chestnut streets	"	..	1	..	..	..	..	1	421,838	90 10
J. P. Barnard, Joy st.	"	3	..	..	..	..	..	3	944,761	195 11
A. Garcelon.....	"	2	..	..	..	..	..	2	288,099	60 54
Amount car'd forw'd.	.....	..	..	..	..	..	..	..	778,682,279	$165,260 77

Name.	Class.	5-8 inch.	1 inch.	2 inch.	3 inch.	4 inch.	Indicator.	Total.	Gallons.	Revenue.
Amount br't forw'd ..	.....	..	..	..	..	..	..	..	778,682,279	$165,260 77
Clark & Brown.....	Stable ..	1	..	..	..	..	..	1	352,598	72 54
G. W. Sherburne....	"	1	..	..	..	..	..	1	116,161	24 25
J. E. Maynard	"	1	..	..	..	..	..	1	652,974	134 89
A. Goss.....	"	1	..	..	..	..	..	1	182,507	38 41
Adams Express Co. ..	"	1	..	..	..	..	..	1	382,074	79 24
John Eaton, Jr.	"	1	..	..	..	..	..	1	126,736	25 92
John Peters.....	"	1	..	..	..	..	..	1	56,369	11 83
J. T. Manson	"	1	..	..	..	..	..	1	335,409	68 99
Warner & Richardson	"	2	..	..	..	..	..	2	433,606	89 87
George M. King	"	1	..	..	..	..	..	1	487,321	101 05
Milo Whitney	"	1	..	..	..	..	..	1	161,776	34 20
Daniel Wood.....	"	1	..	..	..	..	..	1	344,641	70 48
T. D. Sullivan	"	1	..	..	..	..	..	1	153,406	32 74
Ham & Co.....	"	2	..	..	..	..	..	2	372,496	76 33
F. E. Russell.....	"	1	..	..	..	..	..	1	98,664	20 56
Edgar Snow	"	1	..	..	..	..	..	1	43,665	9 26
Israel Tibbitts.....	"	1	..	..	..	..	..	1	239,205	48 99
James Jellison	"	1	..	..	..	..	..	1	251,698	51 50
John Miller	"	1	..	..	..	..	..	1	20,926	4 18
L. H. Brown	"	2	..	..	..	..	..	2	284,783	61 92
Harwood & Hackett..	"	1	..	..	..	..	..	1	240,856	49 48
H. C. Nims.....	"	3	..	..	..	..	..	3	501,031	102 34
Boston Hotels Coach Co.	"	2	..	..	..	..	..	2	1,623,452	337 68
E. W. Murray, Berkeley street	"	1	..	..	..	..	..	1	175,755	35 58
E. W. Murray, Stanhope street.....	"	1	..	..	..	..	..	1	342,076	71 71
Amount car'd forw'd.	.....	..	..	..	..	..	..	..	786,662,464	$166,914 71

Name.	Class.	5-8 inch.	1 inch.	2 inch.	3 inch.	4 inch.	Indicator.	Total.	Gallons.	Revenue.
Amount br't forw'd ..	.....	..	..	..	..	..	..	..	786,662,464	$166,914 71
A. B. Atherton	Stable	1	..	..	..	..	..	1	295,666	62 46
Geo. S. Johnson	"	..	1	..	..	..	..	1	292,913	60 52
Johnson Bros.....	"	1	..	..	..	..	..	1	129,984	26 65
T. Thaxter.....	"	1	..	..	..	..	..	1	121,621	25 10
A. B. Winship	"	1	..	..	..	..	..	1	166,566	35 19
J. F. Howes	"	2	..	..	..	..	..	2	505,576	103 26
Miller & Robinson ...	"	3	..	..	..	..	..	3	256,201	52 72
John Rice	"	3	..	..	..	..	..	3	448,598	93 62
Geo. S. Fogg & Co...	"	2	..	..	..	..	..	2	437,244	92 20
A. D. Pattee	"	1	..	..	..	..	..	1	157,541	32 22
Nelson Brothers.....	"	..	1	..	..	..	..	1	108,256	22 43
Moses Coleman & Son	"	1	..	..	..	..	..	1	146,597	30 47
J. H. Richardson	"	2	..	..	..	..	..	2	231,173	47 76
Northend & Foster...	"	1	..	..	..	..	..	1	127,404	26 10
E. A. Batchelder	"	..	1	..	..	..	..	1	160,395	33 33
Riverside Club Stable	"	1	..	..	..	..	..	1	199,951	43 78
Club Stable, Chardon street.....	"	1	..	..	..	..	..	1	104,529	21 53
Beacon Club Stable..	"	1	..	..	..	..	..	1	110,109	23 55
Z. R. Folsom & Co...	"	1	..	..	..	..	..	1	331,628	69 00
Henry Beckwith.....	"	2	..	..	..	..	..	2	151,755	31 05
F. A. Phelps	"	1	..	..	..	..	..	1	482,312	106 45
A. P. Marion.....	"	1	..	..	..	..	..	1	207,998	42 64
Parker Bryant	"	1	..	..	..	..	..	1	250,816	52 45
B. W. Dean	"	2	..	..	..	..	..	2	227,484	47 67
F. S. Rice & Co.....	"	1	..	..	..	..	..	1	553,989	113 13
M. & W. Ham.....	"	1	..	..	..	..	..	1	321,931	67 03
Amount car'd forw'd.	.....	..	..	..	..	..	..	..	793,190,701	$168,277 02

Name.	Class.	5-8 inch.	1 inch.	2 inch.	3 inch.	4 inch.	Indicator.	Total.	Gallons.	Revenue.
Amount br't forw'd ..	.....	..	..	..	..	..	..	..	793,190,701	$168,277 02
J. H. Pote & Co.	Stable	1	..	..	..	..	..	1	117,901	24 86
J. B. Cassidy & Bro. .	"	1	..	..	..	..	..	1	185,096	38 48
Peck & Hall.....	"	1	..	..	..	..	..	1	260,319	53 79
J. Hale	"	1	..	..	..	..	..	1	191,514	39 64
Ware & Bussigny....	"	1	..	..	..	..	..	1	128,379	26 16
J. A. Riedel & Co....	"	1	..	..	..	..	..	1	136,911	28 25
Union Railway Co. ..	"	3	..	..	..	..	..	3	103,456	21 66
Charles O. Barnard..	"	1	..	..	..	..	..	1	178,394	38 02
E. R. Webster	"	1	..	..	..	..	..	1	132,105	27 42
Club Stable, 75 Chestnut st.....	"	1	..	..	..	..	..	1	194,657	41 16
C. S. Godfrey	"	1	..	..	..	..	..	1	225,961	46 52
Clark & Brown	"	..	1	..	..	..	..	1	718,104	149 58
William Pike.....	"	1	..	..	..	..	..	1	173,273	35 44
A. H. Foss.....	"	1	..	..	..	..	..	1	109,284	22 61
Cilley & Stimson	"	1	..	..	..	..	..	1	227,356	49 27
Club Stable, 44 Joy st.	"	1	..	..	..	..	..	1	283,426	59 02
Ash Critchett	"	1	..	..	..	..	..	1	158,094	32 53
A. S. Eaton.....	"	..	1	..	..	..	..	1	208,921	43 20
L. A. Noyes	"	1	..	..	..	..	..	1	106,770	21 94
Geo. D. Brown.....	"	1	..	..	..	..	..	1	155,777	32 11
J. H. Hathorne.....	"	..	1	..	..	..	..	1	887,724	186 23
H. D. Smith	"	1	..	..	..	..	..	1	273,129	56 56
M. Munroe.....	Stocky'd	..	..	..	..	1	..	1	1,096,240	232 53
Geo. W. Hollis (5mos.)	Slaughtering y'd	1	..	..	..	..	..	1	43,005	8 59
Boston Driving Ass'n.	.....	..	..	1	..	..	..	1	413,475	82 69
Amount car'd forw'd.	.....	..	..	..	..	..	..	..	799,899,972	$169,675 28

Name.	Class.	5-8 inch.	1 inch.	2 inch.	3 inch.	4 inch.	Indicator.	Total.	Gallons.	Revenue.
Amount br't forw'd ..	.....	..	..	..	..	..	..	..	799,899,972	$169,675 28
National Tube Works.	.....	1	..	..	..	..	..	1	510,301	109 58
Globe Nail Works ...	.....	1	1	..	..	..	..	2	870,834	199 36
Farrington & Hunnewell.....	Silversmiths	1	..	..	..	..	..	1	101,566	21 59
B. M. Cunningham ..	Laundry	1	..	..	..	..	..	1	692,618	143 63
I. H. Carey	"	1	..	..	..	..	..	1	73,471	14 68
Manley Howe.....	"	..	1	..	..	..	..	1	567,841	120 43
L. Prang & Co.....	Chromos	..	1	..	..	..	..	1	450,653	94 08
R. G. Morse.....	Engine	1	..	..	..	..	..	1	384,765	82 26
Francis Brooks.....	"	1	..	..	..	..	..	1	290,679	62 29
Walworth Manuf. Co.	"	1	..	..	..	..	..	1	1,547,311	335 25
H. G. Denny.....	"	1	..	..	..	..	..	1	223,621	48 11
Porter & Co.	"	1	..	..	..	..	..	1	509,018	107 96
C. U. Cotting.....	"	..	1	..	..	..	..	1	264,893	56 42
Moses B. Wilde	"	1	..	..	..	..	..	1	357,696	76 10
John Foster.....	"	1	..	..	..	..	..	1	408,331	87 82
J. M. Sears, 45 Arch st.	"	1	..	..	..	..	..	1	1,020,503	217 51
John Briggs & Co....	Mill	1	..	..	..	..	..	1	531,931	111 37
J. S. Potter.....	"	..	1	..	..	..	..	1	846,879	179 97
S. B. Stebbins.....	"	1	..	..	..	..	..	1	710,191	148 07
L. W. Pickens	"	1	..	..	..	..	..	1	745,524	156 96
C. E. Folsom.....	"	1	..	..	..	..	..	1	94,673	19 55
Boston City Flour Mills	"	..	1	..	..	..	..	1	3,855,406	790 80
J. J. McNutt.....	"	..	2	..	..	..	..	2	1,817,746	384 02
Glendon Co.	"	..	1	..	..	..	..	1	1,257,691	266 07
Manson & Peterson..	"	3	..	..	..	..	..	3	769,456	163 63
Amount car'd forw'd.	.....	..	..	..	..	..	..	..	818,803,570	$173,672 79

Name.	Class.	5-8 Inch.	1 inch.	2 inch.	3 inch.	4 inch.	Indicato.	Total.	Gallons.	Revenue.
Amount br't forw'd ..	.....	..	..	..	..	..	..	..	818,803,570	$173,672,79
S. G. Bennett.....	Mill	1	..	..	..	..	..	1	738,539	161 84
Cross & Gilman	"	1	..	..	..	..	..	1	611,236	128 56
McQueston & Fogg ..	"	1	..	..	..	..	..	1	292,059	59 98
J. F. Paul & Co.....	"	..	2	..	..	..	..	2	1,542,654	326 99
Bugbee & Spooner...	"	1	..	..	..	..	..	1	473,297	102 07
J. A. Robertson	"	1	..	..	..	..	..	1	251,265	50 24
Stetson & Pope.....	"	..	1	..	..	..	..	1	Not using.	
Chauncy, Page, & Co.	"	..	1	..	..	..	..	1	711,939	149 80
S. H. L. Pierce.....	"	1	..	..	..	..	..	1	1,002,556	112 65
A. J. Stearns & Son..	"	..	1	..	..	..	..	1	32,393	6 98
Palmer, Parker, & Co.	"	1	..	..	..	..	..	1	802,246	171 63
J. F. Keating.....	"	1	..	..	..	..	..	1	655,786	139 37
Watson & Bisbee	"	1	..	..	..	..	..	1	471,706	97 49
Laming & Drisko....	"	1	..	..	..	..	..	1	353,281	77 28
Cressey & Noyes	"	1	1	..	..	..	..	2	1,107,024	237 36
Smith & Jacobs.....	"	1	..	..	..	..	..	1	725,784	155 65
B. D. Whitcomb.....	"	1	..	..	..	..	..	1	1,076,708	230 32
S. Crosby & Son.....	"	..	1	..	..	..	..	1	771,113	162 45
Nathaniel Cummings.	"	2	..	..	..	..	..	2	253,269	53 30
R. S. Gilmore.....	"	1	..	..	..	..	..	1	Not using.	
Glover & Jones.....	"	1	..	..	..	..	..	1	"	
Atlantic Dyewood Co.	"	..	2	..	..	..	..	2	6,042,774	1,278 14
Standard Dyewood Mill.....	"	..	1	..	..	..	..	1	449,805	89 95
Knowles, Freeman, & Co.	Fish Store.	1	..	..	..	..	..	1	763,404	170 07
G. B. Spaulding & Co.	Bacon Works.	..	1	..	..	..	..	1	278,068	58 93
Amount car'd forw'd.		..	..	..	..	..	..	..	838,210,476	$177,693 84

Name.	Class.	5-8 inch.	1 inch.	2 inch.	3 inch.	4 inch.	Indicator.	Total.	Gallons.	Revenue.
Amount br't forw'd ..	.....	..	..	..	..	..	..	..	838,210,476	$177,693 84
Bond, Blanchard, Worthen & Co.	Bakery .	..	1	..	..	..	..	1	63,548	13 29
G. K. Withington&Co.	"	1	..	..	..	..	..	1	637,883	131 94
J. H. Chadwick	House & Fount'n.	1	..	..	..	..	..	1	53,153	10 63
Horatio Harris (6 ms.)	"	1	..	..	..	..	..	1	Not using.	
J. C. Nichols.....	Wharf purposes	1	..	..	..	..	..	1	71,746	14 34
Warren & Co., Agts..	Steamr's	..	..	1	..	..	..	1	1,115,431	234 23
Hingham Steamboat Co.....	"	..	..	..	1	..	..	1	5,579,698	1,115 93
Portland Steam Packet Co.	"	..	..	..	1	..	..	1	1,853,325	384 56
Thayer & Lincoln....	"	..	..	1	..	..	..	1	Not using.	
J. Henry Sears & Co.	"	..	..	1	..	..	..	1	189,537	37 89
Litchfield Steamboat Co.....	"	..	..	..	1	..	..	1	2,105,265	421 05
House of Correction .	.....	..	..	..	..	1	..	1	12,171,563	2,633 75
Suffolk County Court House	.....	..	2	..	..	..	..	2	1,137,311	241 47
Suffolk County Jail..	.....	1	1	2	..	..	..	3	1,737,090	366 78
Directors of Public Institutions	.....	2	3	1	..	..	..	6	6,522,811	1,414 06
South Ferry	.....	..	..	1	1	..	..	2	7,136,550	1,527 31
North Ferry.....	.....	..	..	..	1	..	..	1	8,276,550	1,768 99
Board of Health	Public Urinals .	1	..	..	..	..	..	1	499,786	103 21
Police Station No. 1	.....	1	..	..	..	..	..	1	236,971	48 90
" " 2	.....	..	1	..	..	..	..	1	391,994	83 44
" " 3	.....	..	1	..	..	..	..	1	356,679	79 16
Amount car'd forw'd.	.....	..	..	..	..	..	..	..	883,347,367	$188,324 77

Name.	Class.	5-8 inch.	1 inch.	2 inch.	3 inch.	4 inch.	Indicator.	Total.	Gallons.	Revenue.
Amount br't forw'd	.....	..	..	..	..	..	..	..	883,347,367	$188,324 77
Police Station No. 4	.....	1	..	..	..	..	..	1	168,405	36 43
" " 5	.....	1	..	..	..	..	..	1	285,204	60 74
" " 6	.....	1	..	..	..	..	..	1	128,243	27 75
" " 7	.....	1	..	..	..	..	..	1	207,783	44 01
" " 8	.....	1	..	..	..	..	..	1	128,741	27 38
" " 9	.....	1	..	..	..	..	..	1	152,948	33 56
" " 10	.....	1	..	..	..	..	..	1	173,768	37 49
" " 12	.....	1	..	..	..	..	..	1	62,851	13 45
" " 13	.....	1	..	..	..	..	..	1	55,584	11 98
City Prison	.....	..	..	1	..	..	..	1	723,525	153 31
L. W. Morrill & Co	Rotary Fan	..	1	..	..	..	..	1	91,718	18 34
John C. Miller	"	..	1	..	..	..	..	1	1,049,048	220 77
First Church	Organ	..	..	..	..	..	1	1	149,382	31 68
King's Chapel	"	..	..	..	..	..	1	1	109,549	26 86
Cathedral of the Holy Cross	"	..	..	..	..	..	2	2	267,000	56 58
Trustees Masonic Building	"	..	..	..	..	..	1	1	50,000	10 00
St. Mary's Church	"	1	..	..	..	..	..	1	454,501	99 70
Tremont-st. M. E. Church	"	..	1	..	..	..	..	1	97,628	21 42
South Cong'l Church	"	..	..	..	..	..	2	2	120,570	26 89
First Univ. Church	"	..	..	..	..	..	1	1	432,303	89 45
Columbus-av. Univ. Church	"	..	1	..	..	..	..	1	86,904	18 16
Shawmut Cong'l Soc'y	"	..	..	1	..	..	..	1	235,500	50 21
Church of the Holy Redeemer	"	..	1	..	..	..	..	1	98,483	20 99
Amount car'd forw'd.	.....	..	..	..	..	..	..	..	888,677,005	$189,461 92

Name.	Class.	5-8 inch.	1 inch.	2 inch.	3 inch.	4 inch.	Indicator.	Total.	Gallons.	Revenue.
Amount br't forw'd	.....	..	..	..	..	..	..	..	888,677,005	$189,461 92
Church of the Immaculate Conception	Organ	..	..	..	..	..	1	1	709,199	148 07
Clarendon-st. Baptist Church	"	..	..	..	..	..	1	1	69,634	14 45
Second Church Soc'y	"	..	..	..	..	..	1	1	118,187	24 61
St. James Church	"	..	..	..	..	..	1	1	201,000	42 22
Brattle-st. Church	"	..	..	..	..	..	1	1	Not using.	
Mason & Hamlin	"	..	..	..	..	..	1	1	9,750	1 95
Boston Society New Jerusalem	"	..	..	..	..	..	1	1	120,177	26 23
Second Hawes Unit. Soc'y	"	1	..	..	..	..	..	1	99,248	21 64
Old South Church Society	"	..	..	..	..	..	1	1	236,250	51 11
Trinity Church Soc'y	"	..	..	..	..	..	2	2	440,250	94 84
German Catholic Ch.	"	..	..	..	..	..	1	1	232,500	49 35
Church of the Good Shepherd	"	..	..	..	..	..	1	1	54,750	11 29
Central Cong'l Soc'y.	"	..	..	..	..	..	1	1	50,250	10 05
J. R. Pierce (4 mos.).	"	..	..	..	..	..	1	1	7,500	1 50
Bancroft & Dyer	Elevator	..	1	..	..	..	..	1	583,171	123 45
John L. Gardner	"	..	..	1	..	..	..	1	69,900	15 54
Job F. Bailey	"	..	1	..	..	..	..	1	620,656	129 62
Henry S. Hovey	"	..	..	1	..	..	..	1	35,550	7 64
E. Williams	"	..	..	..	..	..	1	1	131,250	28 09
Sidney Squires	"	..	1	..	..	..	..	1	175,914	36 81
M. D. Spaulding	"	..	..	..	..	..	1	1	15,713	3 14
William Claflin	"	..	..	1	..	..	..	1	118,725	24 77
S. S. Dunn	"	..	1	..	..	..	..	1	33,312	6 87
Joel Goldthwait & Co.	"	1	..	..	..	..	..	1	26,041	5 20
Amount car'd forw'd.	.....	..	..	..	..	..	..	..	892,835,932	$190,340 36

Name.	Class.	5-8 inch.	1 inch.	2 inch.	3 inch.	4 inch.	Indicator.	Total.	Gallons.	Revenue.
Amount br't forw'd...	.....	..	..	..	..	..	..	..	892,835,932	$190,340 36
Chickering & Sons...	Elevator	..	..	..	..	..	2	2	1,318,875	283 77
Odd Fellows' Building	"	..	..	..	..	..	1	1	28,500	7 12
Davis & Co.	"	..	..	..	..	..	1	1	606,000	127 76
L. Beebe & Sons	"	..	..	..	..	..	1	1	1,184,250	249 67
A. W. Clapp	"	..	..	..	..	..	1	1	Not using.	
Rufus Gibbs & Co....	"	..	..	..	..	..	1	1	Not using.	
James Tucker & Co..	"	..	..	..	..	..	1	1	400,500	85 84
Clark & Warren	"	..	..	..	..	..	1	1	294,000	56 17
E. H. Sampson.....	"	..	..	..	..	..	1	1	652,500	139 20
Stone, Bills, & Whitney	"	..	..	..	..	..	1	1	126,750	26 89
J. C. Haynes.....	"	..	..	..	..	..	1	1	831,000	174 45
Lewis, Brown, & Co..	"	..	..	..	..	..	1	1	1,337,250	284 92
Claflin & Thayer	"	..	..	..	..	..	2	2	1,315,500	278 64
McConnell & Gardner	"	..	..	..	..	..	1	1	318,750	67 16
W. E. Putnam & Co.	"	..	..	..	..	..	1	1	1,060,500	223 69
Henry Bond & Co. ...	"	..	..	..	..	..	1	1	828,000	176 17
J. S. Stone.....	"	..	..	..	..	..	1	1	898,500	188 62
Dennison Manuf'g Co.	"	..	..	..	..	..	2	2	1,422,000	298 53
A. Low & Co.....	"	..	..	..	..	..	1	1	1,691,250	357 15
Clement & Colburn ..	"	..	..	..	..	..	1	1	741,750	158 14
Rhodes & Co.	"	..	..	..	..	..	1	1	1,260,750	267 07
Smith, Richardson, & Bates.....	"	..	..	..	..	..	1	1	1,459,500	306 19
Henry A. Gould	"	..	..	..	..	..	1	1	831,150	176 73
John Cummings & Co.	"	..	..	..	..	..	1	1	1,969,500	409 20
Mitchell, Green, & Stevens.....	"	..	..	..	..	..	1	1	Not using.	
Amount car'd forw'd		..	..	..	..	..	..	..	913,402,707	$194,683,44

Name.	Class.	5-8 inch.	1 inch.	2 inch.	3 inch.	4 inch.	Indicator.	Total.	Gallons.	Revenue.
Amount br't forw'd ..	.....	..	..	..	..	..	..	..	913,402,707	$194,683 44
Mrs. H. W. Harris ..	Elevator	..	..	..	..	..	1	1	355,500	75 30
Mrs. H. W. Harris ..	"	..	..	..	..	..	1	1	Not using.	
Josiah Cummings....	"	..	..	..	..	..	1	1	Not using.	
Hotel Westminster ..	"	..	..	..	..	..	1	1	685,500	144 07
Hotel Warwick.....	"	..	..	..	..	..	1	1	640,950	138 39
Hotel Lyndeboro'....	"	..	..	..	..	..	1	1	2,026,350	428 63
Hotel Clifford	"	..	..	..	..	..	1	1	1,336,800	282 99
Hotel Berwick	"	..	..	..	..	..	2	2	2,440,950	521 15
Hotel Edinburgh	"	..	..	..	..	..	1	1	1,673,250	357 04
Emerson & White....	"	..	..	..	..	..	1	1	875,325	186 31
J. Montgomery Sears	"	..	..	..	..	..	2	2	939,825	202 73
Mrs. J. Longley	"	..	..	..	..	..	1	1	33,225	7 02
J. B. Kimball & Co...	"	..	..	..	..	..	1	1	571,500	118 72
First National Bank..	"	..	..	..	..	..	1	1	3,684,563	833 27
Notman & Campbell .	"	..	..	..	..	..	1	1	176,250	37 76
Martin, Skinner, & Fay	"	..	..	..	..	..	1	1	744,000	153 64
A. A. Pope & Co.....	"	..	..	..	..	..	1	1	744,000	156 00
A. Storrs & Co.....	"	..	..	..	..	..	1	1	554,625	114 08
Abram French & Co..	"	..	..	..	..	..	1	1	750,600	158 16
Talbot, Wilmarth, & Co.	"	..	..	..	..	..	1	1	570,750	122 44
Albert Metcalf	"	..	..	..	..	..	1	1	24,060	5 40
Edward Spaulding ...	"	..	..	..	..	..	1	1	254,250	52 76
Withington & Hall...	"	..	..	..	..	..	1	1	465,000	97 72
Josiah Cummings....	"	..	..	..	..	..	2	2	272,700	57 13
Fairbanks & Brown..	"	..	..	..	..	..	1	1	675,300	142 17
Amount car'd forw'd.	.....	..	..	..	..	..	..	..	933,897,980	$199,076 32

Name.	Class.	5-8 inch.	1 inch.	2 inch.	3 inch.	4 inch.	Indicator.	Total.	Gallons.	Revenue.
Amount br't forw'd ..	.....	..	..	..	..	..	..	..	933,897,980	$199,076 32
Grosvenor & Richards	Elevator	..	..	..	..	..	1	1	270,750	57 60
W. E. Underwood....	"	..	..	..	..	..	1	1	440,311	91 37
George D. Howe	"	..	..	..	..	..	2	2	1,421,100	303 27
Lord, Whittemore, & Co.....	"	..	..	..	..	..	2	2	Not using.	
Converse & Stanwood	"	..	..	..	..	..	1	1	510,150	106 35
John F. Mills, estate.	"	..	..	..	..	..	1	1	2,361,713	507 13
Daniels, Badger, & Co.	"	..	..	..	..	..	1	1	600,750	127 42
Wright, Worster, & Delano	"	..	..	..	..	..	1	1	637,350	136 05
Hotel La Fayette	"	..	..	..	..	..	6	6	3,487,860	733 06
Hotel Baldwin	"	..	..	..	..	..	1	1	1,127,250	240 49
Doll & Richards	"	..	..	..	..	..	2	2	625,500	132 88
S. G. Allen	"	..	..	..	..	..	1	1	850,350	180 23
Thomas Groom.....	"	..	..	..	..	..	1	1	440,925	93 98
Monks & Co.....	"	..	..	..	..	..	2	2	2,566,500	545 64
Enoch Page.....	"	..	..	..	..	..	1	1	4,770	95
F. R. Sears	"	..	..	..	..	..	1	1	48,900	10 49
Lawrence Building ..	"	..	..	..	..	..	1	1	2,568,700	596 16
S. D. Warren.....	"	..	..	..	..	..	1	1	150,450	35 38
Howe Bros.....	"	..	..	..	..	..	2	2	264,075	55 76
Dyer, Taylor, & Co...	"	..	..	..	..	..	6	6	1,258,614	263 52
Henry Bond	"	..	..	..	..	..	1	1	1,311,000	274 95
David Parker & Co...	"	..	..	..	..	..	2	2	347,438	73 29
J. Montgomery Sears, 12 Arlington st.....	"	..	..	..	..	..	1	1	200,288	41 12
A. W. Stetson.....	"	..	..	..	..	..	1	1	39,608	8 86
Amount car'd forw'd.	.....	..	..	..	..	..	..	..	955,432,332	$203,692 27

Name.	Class.	5-8 inch.	1 inch.	2 inch.	3 inch.	4 inch.	Indicator.	Total.	Gallons.	Revenue.
Amount br't forw'd	.....	..	..	..	..	..	..	..	955,432,332	$203,692 27
H. A. Turner & Co.	Elevator	..	..	..	..	..	2	2	510,000	102 59
R. M. Hodges	"	..	..	..	..	..	1	1	64,725	12 94
J. H. Wright	"	..	..	..	..	..	1	1	10,051	2 32
H. & J. Pfaff (8 mos.)	"	..	..	..	..	..	2	2	569,722	113 92
Osgood & Greenough	"	1	..	..	..	..	..	1	301,441	60 27
Hotel Comfort (7 mos.	"	..	..	..	..	..	6	6	267,608	53 51
Duffy, Cashman, & Co. (8 mos.)	"	..	:	..	..	..	1	1	185,475	37 09
Jones, Cook, & Co. (6 mos.)	"	..	..	..	..	..	1	1	138,750	27 75
Moses Williams (6 mos.)	"	..	..	..	..	..	2	2	563,475	112 70
A. L. Dickerman (6 mos.)	"	..	..	..	..	..	2	2	213,173	42 63
Peter C. Brooks (5 mos.)	"	..	..	..	..	..	1	1	145,050	29 01
Continental Block (3 mos.)	"	..	..	..	..	..	1	1	143,175	28 63
Gardiner, Murphy, & Co. (4 mos.)	"	..	..	..	..	..	1	1	200,250	40 05
Mrs. T. B. Williams (6 mos.)	"	..	..	..	..	..	1	1	102,848	20 56
E. R. Mudge (3 mos.)	"	..	..	..	..	..	1	1	42,000	8 40
Howard Nat'l Bank	"	..	..	..	..	..	2	2	1,963,125	402 67
Sidney Bartlett	"	..	..	..	..	..	1	1	71,025	15 80
Wendell, Fay, & Co.	"	..	..	..	..	..	1	1	636,750	135 90
Continental B. Build'g	"	..	..	..	..	..	1	1	2,058,975	437 33
C. D. Swain & Co.	"	..	..	..	..	..	1	1	181,575	37 84
J. A. & W. Bird	"	..	..	..	..	..	1	1	1,869,225	391 93
Amount car'd forw'd	.....	..	..	..	..	..	..	..	965,670,750	$205,806 11

Name.	Class.	5.8 inch.	1 inch.	2 inch.	3 inch.	4 inch.	Indicator.	Total.	Gallons.	Revenue.
Amount br't forw'd ..	.....	..	..	..	..	..	..	..	965,670,750	$205,806 11
A. Wentworth.....	Elevator	..	..	..	..	..	1	1	52,500	10 50
Atlantic Nat'l Bank..	"	..	..	..	..	..	1	1	855,227	181 41
R. E. Apthorp.....		..	..	..	..	..	1	1	3,248,550	685 77
F. Gordan Dexter....	"	..	..	..	..	..	2	2	3,204,300	693 14
Banfield, Forristall, & Co.	"	..	..	..	..	..	1	1	2,034,825	423 26
J. & J. Dobson.....	"	..	..	..	..	..	1	1	371,700	77 11
Robbins & Kellogg...	"	..	..	..	..	..	1	1	1,003,350	210 62
Houghton & Coolidge.	"	..	..	..	..	..	1	1	749,025	156 80
Horswell, Kinsley, & French	"	..	..	..	..	..	1	1	552,075	115 63
J. T. Bailey	"	..	..	..	..	..	1	1	69,294	14 62
Z. A. Willard	"	..	..	..	..	..	2	2	504,474	107 40
F. M. Johnson	"	..	..	..	..	..	1	1	2,235,000	474 90
Minot, Hooper, & Co.	"	..	..	..	..	..	1	1	2,211,300	465 42
J. P. Paine	"	..	..	..	..	..	1	1	719,250	153 37
Miss C. D. Brewer ..	"	..	..	..	..	..	1	1	9,848	1 96
J. M. Beebe	"	..	..	..	..	..	1	1	32,521	7 10
John Holman	"	..	..	..	..	..	1	1	459,825	95 05
Paul & Co.....	"	..	..	..	..	..	2	2	359,325	75 73
Oliver Ditson & Co...	"	..	..	..	..	..	1	1	707,700	150 41
W. H. Slocum	"	..	..	..	..	..	2	2	819,675	170 94
Charles H. Ward	"	..	..	..	..	..	1	1	478,840	99 12
Doe & Hunnewell....	"	..	..	..	..	..	2	2	779,400	162 97
J. Cottle.....	"	..	..	..	..	..	2	2	593,513	123 71
A. A. Lawrence.....	"	..	..	..	..	..	2	2	5,322,450	1,136 32
David Parker & Co ..	"	..	..	..	..	..	2	2	1,163,925	241 28
Amount car'd forw'd.		..	..	..	..	..	..	..	994,208,642	$211,840 65

Name.	Class.	5-8 inch.	1 inch.	2 inch.	3 inch.	4 inch.	Indicator.	Total.	Gallons.	Revenue.
Amount br't forw'd .	.....	..	..	..	..	..	..	..	994,208,642	$211,840 65
Joseph Peabody	Elevator	..	..	..	..	..	1	1	144,525	33 04
S. N. Brown, Jr. ...	"	..	..	..	..	..	1	1	48,526	10 53
F. O. White	Motor ..	..	..	..	..	..	1	1	68,250	14 59
E. N. Yerxa.....	" ..	..	..	..	..	..	1	1	94,500	18 90
L.W. & H. F. Morse.	" ..	..	..	..	..	..	1	1	45,750	9 86
Jacob Wirth	" ..	..	..	..	..	..	1	1	350,250	70 05
A. J. Knight (3 mos.)	" ..	..	..	..	..	..	1	1	6,000	1 20
Cobb Bros. (4 mos.).	" ..	..	..	..	..	..	1	1	129,000	25 80
W. E. Richards.....	" ..	..	..	..	..	..	1	1	72,000	14 40
Atlan'cTeaCo. (1mo)	" ..	..	..	..	..	..	1	1	35,250	7 05
Cedar Grove Cemet'y	Cemet'ry ..	..	..	..	1	..	..	1	372,450	37 23
Forest Hills Cemet'y	"	..	..	..	1	..	..	1	2,837,175	283 71
Paul Knowles and others	Marine Watermen as per contract...	..	..	..	3	..	..	3	2,053,241	513 26
	.....	..	..	..	..	..	..	..	1,000,465,559	$212,880 27

Statement showing the number of houses, stores, steam-engines, etc., in the City of Boston, supplied with water to the 1st of January, 1880, with the amount of water-rates received for 1879 : —

32,476	Dwelling-houses	$481,636 92
29	Boarding-houses	1,398 75
1,513	Model-houses	37,284 42
15	Lodging-houses	461 50
15	Hotels	916 75
5,862	Stores and shops	64,717 00
516	Buildings	21,979 43
825	Offices	7,388 71
46	Public halls	714 36
4	Theatres	124 00
33	Private schools	620 25
25	Asylums	1,528 00
5	Hospitals	264 00
64	Greenhouses	1,554 17
137	Churches	2,176 33
9	Market-houses	1,255 50
85	Cellars	578 33
198	Restaurants	6,103 88
642	Saloons	13,072 74
235	Bar-rooms	1,527 58
18	Club-houses	359 25
31	Photographers	885 50
41	Packing-houses	1,637 84
1,819	Stables	13,601 10
50	Factories	1,898 67
6	Bleacheries	141 87
131	Bakeries	1,245 25
11	Freight-houses	252 00
3	Gasometers	64 00
2	Cemeteries	70 75
3	Bath-houses	65 00
4	Ship-yards	46 25
3	Dry-docks and engines	100 00
154	Shops and engines	7,429 08
15	Factories and engines	922 75
11	Printing and engines	851 40
1	Foundry and engine	92 50
2	Ship-yards and engines	60 42
2	Bakeries and engines	105 00
27	Stationery engines	2,221 18
	Amount carried forward	$677,352 43

	Amount brought forward	$677,352 43
55	Discharging and pile-driving engines	661 00
9	Armories	152 00
1,670	Hand-hose	9,515 00
10	Fountains	115 00
29	Tumbler-washers	450 00
109	Beer water-pressures	545 00
44	Laundries	1,213 68
10	Aquariums	120 00
16	Railroad stations	275 50
67	Steam and Tug Boats	9,685 76
11	Motors	75 00
1	Laboratory	50 00
	Custom House	85 00
2	Police Stations	67 00
45	Fire-engines, hose, and hook and ladder houses	990 00
7	Chemical engine-houses	105 00
3,898	Fire hydrants	70,164 00
129	Reservoirs	2,322 00
	Repair shop	35 50
	Steamer "Wm. M. Flanders"	200 00
	Steamer "J. P. Bradlee"	200 00
	Steamer "Samuel Little"	100 00
	Steamer "Protector"	100 00
	Public Schools	4,227 00
	Street-watering	1,470 06
	Street-sprinkling	13 74
	Paving Department	423 75
	Internal Health Department	1,570 00
	Common Sewer Department	200 00
	Lamp Department	42 25
	Committee on Common and Squares	385 00
	Committee on Bridges	82 00
	Filling cisterns, etc.	43 44
	District Court House	16 00
	Branch Libraries	71 50
	Directors of Public Institutions	263 00
	Ice Company (washing ice)	15 00
	Building purposes	2,047 60
	Metered water (9 months)	159,708 59
		$945,157 80

The following table exhibits the yearly increase of water-takers since January 1, 1850 : —

					Takers.	Increase.
From January 1,	1850,	to January 1,	1851,		13,463	
" "	1851,	"	1852,		16,076	2,613
" "	1852,	"	1853,		16,862	786
" "	1853,	"	1854,		18,110	1,308
" "	1854,	"	1855,		19,193	1,023
" "	1855,	"	1856,		19,998	805
" "	1856,	"	1857,		20,806	808
" "	1857,	"	1858,		21,602	796
" "	1858,	"	1859,		22,414	812
" "	1859,	"	1860,		23,271	857
" "	1860,	"	1861,		24,316	1,045
" "	1861,	"	1862,		25,486	1,170
" "	1862,	"	1863,		26,289	803
" "	1863,	"	1864,		26,851	562
" "	1864,	"	1865,		27,046	195
" "	1865,	"	1866,		27,489	443
" "	1866,	"	1867,		27,754	265
" "	1867,	"	1868,		28,104	350
" "	1868,	"	1869,		29,738	1,634
" "	1869,	"	1870,		31,500	1,762
" "	1870,	"	1871,		36,132	4,632
" "	1871,	"	1872,		38,716	2,584
" "	1872,	"	1873,		40,688	1,972
" "	1873,	"	1874,		42,345	1,657
" "	1874,	"	1875,		44,676	2,331
" "	1875,	"	1876,		46,885	2,209
" "	1876,	"	1877,		48,328	1,443
" "	1877,	"	1878,		49,970	1,642
" "	1878,	"	1879,		51,523	1,553
" "	1879,	"	1880,		52,268	745

The following table exhibits the yearly revenue from the sale of Cochituate water since its introduction into the city, October 25, 1848 : —

Received by Water Commissioners, as per Auditor's Report in 1848					$972 81
From January 1, 1849,	to January 1,	1850 .			71,657 79
" "	1850,	"	1851 .		99,025 45
" "	1851,	"	1852 .		161,052 85
" "	1852,	"	1853 .		179,567 39
" "	1853,	"	1854 .		196,352 32
" "	1854,	"	1855 .		217,007 51
" "	1855,	"	1856 . .		266,302 77
Amount carried forward . . .					$1,191,938 89

Amount brought forward			.	$1,191,938 89
From January 1, 1856,	to January 1,	1857	.	282,651 84
" " 1857,	"	1858	.	289,328 83
" " 1858,	"	1859	.	302,409 73
" " 1859,	"	1860	.	314,808 97
" " 1860,	"	1861	.	334,544 86
" " 1861,	"	1862	.	365,323 96
" " 1862,	"	1863	.	373,922 33
" " 1863,	"	1864	.	394,506 25
" " 1864,	"	1865	.	430,710 76
" " 1865,	"	1866	.	450,341 48
" " 1866,	"	1867	.	486,538 25
" " 1867,	"	1868	.	522,130 93
" " 1868,	"	1869	.	553,744 88
" " 1869,	"	1870	.	597,328 55
" " 1870,	"	1871	.	708,783 68
" " 1871,	"	1872	.	774,445 70
" " 1872,	"	1873	.	862,704 08
" " 1873,	"	1874	.	917,415 92
" " 1874,	"	1875	.	977,020 48
" " 1875,	"	1876	.	1,005,120 94
" " 1876,	"	1877	.	1,029,643 70
" " 1877,	"	1878	.	1,015,562 89
" " 1878,	"	1879	.	1,010,584 30
" " 1879,	"	1880	.	1,025,803 14
" " 1880,	to May 1,	1880	.	802,925 23
				$17,020,240 57

DRINKING-FOUNTAINS.[1]

There are 53 drinking-fountains established within the city limits: —

City Proper.

* Boston Common (6):
North square.
Washington street, near Elm.
" " opposite Blackstone square.
Atlantic avenue, junction Commercial street.
" " head of Rowe's wharf.
" " near N.Y. & N.E. R.R. freight-house.
Haymarket square.
Causeway street, at Boston and Lowell R.R. depot.
" " junction Merrimac street.
Charles street, opposite the jail.
" " between Boylston and Beacon streets.
" " near Boylston street.

[1] Those marked * are arranged for a continuous flow of water. The balance have automatic fixtures, operating the flow of water when required.

Beacon street, near Charles street.
Tremont street, near Clarendon street.
Albany street, opposite Water Works, pipe-yard.
Mt. Washington avenue, near the drawbridge.

East Boston.

Maverick square.
Central square.
Bennington street, junction Chelsea street.

South Boston.

Foundry street, opposite First street.
Fourth street, near Foundry street.
" " junction Emerson street.
" " corner of Q street.
Telegraph Hill.
Sixth street, near P street.
Washington Village, junction Dorchester avenue and Dorchester street.

Roxbury.

Albany street, junction Dearborn street.
Beacon street, junction Brookline avenue.
* Eliot square.
Eustis street, near Washington street.
Heath street, near Tremont street.
Pynchon street, near Roxbury street.
Tremont street, junction Cabot street.

West Roxbury.

Centre street, junction Day and Perkins street.
Centre and La Grange streets, West Roxbury Village.
Morton street, junction South street.
Roslindale, Taft's Hotel.
Washington street, near Williams street.

Dorchester.

Commercial street, opposite Beach street.
Neponset avenue, corner Walnut street.
Upham's Corner.
Glover's Corner.
Grove Hall.

Brighton.

Barry's Corner.
Market street, Cattle-Fair Hotel.
Union square.
Western avenue, Charles-river Hotel.

There are eighteen stand-pipes now located for street-sprinkling purposes as follows: —

Tremont street and Hammond park.
Clay street, corner Tremont street.

Eliot square.
Brookline avenue, corner Longwood avenue.
St. James street, corner Warren street.
Blue Hill avenue, between Waverly and Clifford streets.
Warren street, corner Gaston street.
Egleston square, corner Walnut avenue.
Dale street, opposite Harvard avenue.
Upham's Corner.
Field's Corner.
Dorchester avenue, near Savin Hill avenue.
Dorchester avenue, at Old Boston line.
Beach street, Harrison square.
Union square, Brighton.
Washington street, corner Winship street, Brighton.
Chestnut Hill avenue, corner of South street.
Dudley street, opposite Harvard avenue.

Statement showing the Number and Kind of water Fixtures contained within the Premises of Water-takers in the City of Boston, January 1, 1880, as compared with previous years.

1877.	1878.	1879.	
8,386	8,716	8,900	Taps. These have no connection with any drain or sewer.
80,340	81,842	84,138	Sinks.
41,359	43,044	46,034	Wash-hand basins.
14,300	15,121	15,751	Bathing-tubs.
22,704	24,956	26,142	Pan water-closets.
1,038	777	726	Hopper water-closets.
20,680	22,006	22,855	" " automatic.
539	619	622	" " waste.
1,438	1,478	1,386	Urinals.
2,307	2,226	2,450	" automatic.
16,608	17,517	18,406	Wash-tubs. These are permanently attached to the building.
598	534	590	Shower-baths.
263	237	211	Private hydrants.
850	853	1,004	Slop-hoppers.
106	125	138	Foot-baths.
211,516	220,051	229,353	

Respectfully submitted,

WM. F. DAVIS,
Water Registrar.

REPORT OF THE MYSTIC WATER REGISTRAR FOR THE YEAR 1879-80.

OFFICE OF THE MYSTIC WATER REGISTRAR,
BOSTON, CHARLESTOWN DISTRICT, May 1, 1880.

LEONARD R. CUTTER, Esq.,
Chairman Boston Water Board: —

SIR,— I herewith present the Annual Report of the Mystic Water Registrar, for the year ending April 30, 1880, in conformity with the city ordinance.

The total number of water-takers now entered for the year 1880 is 20,566, distributed as follows: Charlestown District, 6,092; East Boston, 4,500; Chelsea, 4,654; Somerville, 4,552; Everett, 768.

The total amount of water-rates received from May 1, 1879, to May 1, 1880, is as follows: —

Charlestown District	$99,894 05
East Boston	44,013 24
Chelsea	51,068 42
Somerville	55,891 73
Everett	7,685 18
	$258,552 62

The amount paid the cities of Chelsea, Somerville, and town of Everett, as per contract is	$24,409 83	
The amount paid Cochituate Water Department for water furnished East Boston, from July 23 to Dec. 24, 1879, is	19,172 70	
The amount received for water used in previous years is .	8,920 06	
Leaving the net receipts for water furnished during the year	206,050 03	
		$258,552 62

Amount brought forward . . .	$258,552 62

Amount brought forward . . .		$258,552 62
In addition to the above amount, there has been received, for labor and material, furnished for work outside this department, but connected with the water-works, the sum of . .	$249 52	
Fines, non-payments . .	382 00	
Fees, summons . . .	319 00	
Maintaining meters . .	204 50	
Off and on water for repairs .	122 00	
Sale of old material . .	65 00	
		1,342 02
Total amount received during the year .		$259,894 64

The expenses of the office during the year ending April 30, 1880, including all charges for collections in Chelsea, Somerville, and Everett, were $6,304.79.

Table showing the number of places turned off for non-payment of rates during the year 1879, the number turned on again, and the number still remaining off.

	Number turned off.	Number turned on.	Number remaining off.
Charlestown District	104	81	23
Chelsea	201	135	66
Somerville	93	84	9
Everett	24	6	18
Total	422	306	116

The places turned of for non-payment of rates in East Boston are included in the report of the Water Registrar of the Cochituate Water Department.

STAND-PIPES FOR STREET WATERING.

The whole number in use in this department is 29, distributed as follows: —

Charlestown District.

Cambridge street, near Stickney & Poor's factory.
" " Railroad.

Rutherford avenue, near City stables.
" " Allen street.
South Eden street, " Main street.
Prescott " " Harvard School building.
Monument square, " Laurel street.

Chelsea.

Cary square, corner Forsyth street.

Somerville.

Washington street, corner Boston street.
" " Myrtle street.
" near Union square.
Summer street, " Elm street.
" " Laurel street.
Somerville avenue, " Poplar street.
" " Cambridge line.
" " Merriam street.
Broadway, " Franklin street.
" opposite Public park.
School street, near Somerville avenue.
Spring street, " "
Beacon street, " Cooney street.
Pinckney street, " Pearl street.
Pearl street, " Cross street.
Thurston street, " Broadway.
Highland avenue, corner Medford street.

Everett.

Broadway, near Engine house.
" " Pleasant street.
" " Chandler's.
Main street, " Chelsea street.

DRINKING-FOUNTAINS.

The whole number in use in this department is 21, distributed as follows: —

Charlestown District.

City square, corner Park street.
Chelsea street, " Wapping street.
Bunker Hill street, corner Tufts street.
Canal street, " South Eden street.
Main street, " Hancock square.
" near Tufts wharf.
Austin street, opposite Front street.

Chelsea.

Broadway square,
" near bridge.
Winnisimmet street, near Ferry.
Pearl street, corner Marginal street.
Eastern avenue, corner Crescent avenue.

Somerville.

Union square (2).
Broadway, corner Walnut street.
Highland avenue, corner Walnut street.
Medford street, " Central street.
Davis square (2).
Broadway, opposite Public park.

Everett.

Main street, junction Broadway.

East Boston.

(See Cochituate Water Registrar's Report.)

One of the fountains in Union square, one at the corner of Highland avenue and Walnut street, one at Davis square, Somerville, and one on Broadway, near the bridge, Chelsea, have automatic fixtures regulating the water supply. The others are so arranged that the water flows continuously.

Table showing the Number and Size of Meters, also the Number of Motors in the Mystic Water Department.

	Size of Meters.								
	⅝ inch.	¾ inch.	1 inch.	1½ inch.	2 inch.	3 inch.	4 inch.	Motors.	Total.
Charlestown District . .	35	1	22	3	21	3	4	2	91
East Boston	21	. . . .	23	. . . .	8	3	. . . .	. . . .	55
Chelsea . .	17	1	9	. . . .	6	1	. . . .	2	36
Somerville .	9	2	9	2	1	. . . .	2	2	27
Everett . .	. . . .	1	4	. . . .	2	. . . .	. . . .	. . . .	7
Total . . .	82	5	67	5	38	7	6	6	216

Table showing the Number of Dwelling-Houses, Stores, etc., supplied with Mystic-Pond Water.

	Dwelling-Houses.	Families.	Stores and Saloons.	Manufactories.	Offices, Halls, and Clubs.	Churches.	Stables.	Public Schools.	Fire Hydrants.	Miscellaneous.
Charlestown District	4,783	7,761	500	100	117	14	383	101	219	94
East Boston	3,569	5,864	247	16	13	10	171	76	297	16
Chelsea	3,718	4,665	289	69	73	12	378	61	136	54
Somerville	3,569	4,700	139	26	29	10	654	85	271	40
Everett	582	668	16	9	5	1	133	6	68	16
Total	16,221	23,658	1,191	220	237	47	1,719	329	991	220

Table showing the Number and Kind of Water Fixtures contained within the Premises of Water-takers.

	Taps.	Sinks.	Wash-hand Basins.	Bath-Tubs.	Water Closets.						Urinals.	Wash-Tubs.	Hand Hose.	Private Hydrants.
					Pan.	Self-acting.	Hoppers.	Waste.	Automatic.	Slop-Hoppers.				
Charlestown District	1,474	9,760	1,725	806	1,370	2,521	54	29	138	11	70	723	302	38
East Boston	541	7,796	831	513	647	.....	18	30	1,831	4	18	244	55	23
Chelsea	795	5,935	1,338	823	1,146	1,405	46	33	65	4	41	456	249	13
Somerville	1,154	5,670	1,437	1,047	1,338	1,270	32	49	23	3		561	446	22
Everett	243	749	114	89	88	32	3	1	2	.....	5	41	119	3
Total	4,207	29,910	5,445	3,278	4,589	5,228	153	142	2,059	22	206	2,025	1,171	99

METER STATEMENT.

The following Table exhibits the Class of Premises to which Meters are attached, together with the Amount of Revenue received during the year 1879.

Name.	Class.	⅝ inch.	¾ inch.	1 inch.	1½ inch.	2 inch.	3 inch.	4 inch.	Indicator.	Total.	Gallons.	Revenue.
CHARLESTOWN DISTRICT.												
United States of America	Navy Yard	.	.	.	.	.	.	2	.	2	20,775,824	4,457 95
United States of America	Marine Barracks	.	.	.	.	.	1	.	.	1	1,454,025	307 12
Wilkesbarre Coal Co.	Hoisting Engines	.	.	.	1	.	.	.	.	1	328,284	103 10
Boston and Maine Railroad Co.		1	.	1	.	1	2	.	.	5	24,290,704	5,104 43
Eastern Railroad Co.		1	.	1	.	6	.	.	.	8	27,123,923	5,758 35
Fitchburg Railroad Co.		2	.	.	.	4	.	.	.	6	18,658,778	3,949 88
Boston, Lowell, and Nashua Railroad Co.	Elevator	1	.	.	.	1	.	.	.	2	339,137	71 00
Charlestown Gas Co.	Gas Works	2	.	.	.	1	.	.	.	3	1,370,018	295 92
William T. Van Nostrand & Co.	Brewery	.	.	.	.	1	.	.	.	1	4,117,695	872 84
Waverley House	Hotel	.	.	2	1	.	.	.	.	3	952,412	202 09
J. T. Hicks	Hall	.	.	1	.	.	.	.	.	1	166,681	35 26
Nahum Chapin	Distillery	.	.	1	.	.	.	.	.	1	1,157,767	250 04
Prescott School		.	.	.	1	.	.	.	.	1	591,750	118 35
Oriental Oil Co.	Oil Works	.	.	1	.	.	.	.	.	1	1,198,355	261 76

Thomas Cunningham	Boiler Maker	.	.	2	.	.	.	.	.	2	1,304,231		275	39
Hallowell Granite Co	Granite Works	.	.	1	.	.	.	.	.	1	297,821		60	22
J. Peck & Son	Salt Works	.	.	1	.	.	.	.	.	1	373,381		90	07
Tudor Company	Factory	.	.	.	.	.	.	1	.	1	1,017,151		206	64
Tucker Manufacturing Company	"	.	.	.	.	.	.	1	.	1	2,448,825		511	28
American Wood Preserving Co	"	.	.	.	.	1	.	.	.	1	713,475		152	81
Geo. H. Buxton	Stable	1	.	.	.	.	.	.	.	1	130,341		27	75
M. Rogan	Hoisting Engines	1	.	1	.	2	.	.	.	4	976,981		198	55
George E. Rogers	Stable	1	.	.	.	.	.	.	.	1	130,980		27	10
Edmands & Co	Cement Pipe Works	.	.	1	.	.	.	.	.	1	119,288		23	86
D. & H. Pattee	Factory	1	.	.	.	.	.	.	.	1	42,601		9	02
St. Francis De Sales Church	Organ	.	.	.	.	.	.	.	1	1	450,000		94	99
Davidson Rubber Co	Factory	.	.	1	.	.	.	.	.	1	1,276,635		271	05
Kennan, French & Co	"	.	.	1	.	.	.	.	.	1	1,012,666		216	05
Merchants' Tobacco Company	"	1	.	.	.	1	.	.	.	2	1,309,831		270	61
C. G. McIntosh	"	.	1	.	.	.	.	.	.	1	445,220		89	05
Samuel W. Brown Manufacturing Company	"	1	.	.	.	.	.	.	.	1	93,091		19	27
Wemyss Bros	"	.	.	1	.	.	.	.	.	1	520,651		113	15
Stickney & Poor	"	1	.	.	.	.	.	.	.	1	342,459		72	39
George S. Hall	"	1	.	.	.	.	.	.	.	1	214,111		45	23
Owen Callahan	"	1	.	.	.	.	.	.	.	1	127,186		26	03
Amount carried forward		.	.	.	.	.	.	.	.	.	115,872,278		24,588	60

METER STATEMENT. — *Continued.*

Name.	Class.	⅝ inch.	¾ inch.	1 inch.	1½ inch.	2 inch.	3 inch.	4 inch.	Indicator.	Total.	Gallons.	Revenue.
Amount brought forward		.	.	.	.	.	.	.	.	.	115,872,278	24,588 60
CHARLESTOWN DISTRICT.—*Continued.*												
F. C. Sewall	Factory	1	.	.	.	.	.	.	.	1	121,271	24 36
Merriam & Norton	"	1	.	.	.	.	.	.	.	1	167,205	35 55
Nathaniel Tufts	"	1	.	.	.	.	.	.	.	1	143,394	31 31
Robert Webb & Co	"	1	.	.	.	.	.	.	.	1	42,671	9 50
Foundry Supply Co	"	1	.	.	.	.	.	.	.	1	124,534	26 25
Anthony Waterman	Mill	.	.	1	.	.	.	.	.	1	1,159,913	249 89
Page & Littlefield	"	.	.	1	.	.	.	.	.	1	548,649	115 67
Melvin & Co	Grain Mill	.	.	1	.	.	.	.	.	1	1,049,199	221 19
Middlesex Railroad Co	Stable	1	.	.	.	2	.	.	.	3	2,108,041	441 07
John P. Barnard	"	.	.	1	.	.	.	.	.	1	788,888	166 85
D. W. Beckler	"	.	.	1	.	.	.	.	.	1	495,421	103 80
Wm. S. & Geo. O. Wiley	"	1	.	.	.	.	.	.	.	1	236,625	48 57
T. J. Priest	"	2	.	.	.	.	.	.	.	2	559,958	121 01
Union Club Stable	"	1	.	.	.	.	.	.	.	1	200,340	41 60
Boston Ice Company	"	1	.	.	.	.	.	.	.	1	149,141	30 81

George W. Maynard	Stable	1	.	.	.	.	.	.	1	140,265		29 21		
Jesse Rideout	"	1	.	.	.	.	.	.	1	123,339		25 69		
N. Y. Brintnall	"	2	.	.	.	.	.	.	2	125,934		25 85		
H. T. Meserve	Boarding	1	.	.	.	.	.	.	1	104,986		21 70		
J. V. N. Stults	"	1	.	.	.	.	.	.	1	134,147		27 88		
Cook, Rymes & Co.	Machinists	.	.	1	.	.	.	.	1	580,014		123 87		
Johnson & Young	Lobster Boiler	1	.	.	.	.	.	.	1	298,261		64 40		
Union Methodist Church	Organ	.	.	.	.	.	.	1	1	72,525		15 42		
Joseph Gahm	Restaurant	1	.	.	.	.	.	.	1	131,686		27 65		
Peterson & Jameson	Water Boats	.	.	.	.	1	.	.	1	276,525	125,755,210	60 21		$26,677 91
CHELSEA SUPPLY.														
United States of America	Marine Hospital	.	.	.	.	1	.	.	1	960,225		201 97		
United States of America	Naval Hospital	.	.	.	.	1	.	.	1	981,175		214 05		
City Hotel	Hotel	1	.	.	.	.	.	.	1	301,051		62 98		
Chelsea Gas Light Co	Gas Works	1	.	1	.	.	.	.	2	344,251		75 96		
E. E. Sibley, Agent	Laundry	.	.	.	.	1	.	.	1	2,241,675		474 98		
Charles A. Campbell	Wharf	1	.	.	.	1	.	.	2	576,308		119 47		
Eastern Railroad	Station	.	.	1	.	.	.	.	1	601,726		148 39		
Boston Elastic Fabric Co	Factory	1	.	.	.	1	.	.	2	1,509,473		304 01		
P. F. McDonough	"	.	.	1	.	.	.	.	1	433,673		93 29		
Thomas L. Appleton	"	1	.	.	.	.	.	.	1	285,346		59 77		
Amount carried forward		.	.	.	.	.	.	.	.	8,234,903	125,755,210	1,754 87		$26,677 91

METER STATEMENT. — *Continued.*

Name.	Class.	⅝ inch.	¾ inch.	1 inch.	1½ inch.	2 inch.	3 inch.	4 inch.	Indicator.	Total.	Gallons.		Revenue.	
Amount brought forward		.	.	.	.	.	.	.	.	.	8,234,903	125,755,210	1,754 87	26,677 91
CHELSEA SUPPLY. — *Continued.*														
White, Peirce & Co.	Factory	1	.	.	.	.	.	.	.	1	547,808		115 64	
Thomas Cunningham	"	1	.	.	.	.	.	.	.	1	308,866		64 04	
J. B. Alley & Co.	"	.	.	1	.	.	.	.	.	1	849,031		174 36	
C. W. Killam	"	1	.	.	.	.	.	.	.	1	94,838		18 97	
L. L. Pease	Stable	1	.	.	.	.	.	.	.	1	289,561		60 16	
John W. Bartlett	"	1	.	.	.	.	.	.	.	1	251,071		51 51	
Lynn & Boston Railroad Company	"	.	.	1	.	.	.	.	.	1	589,764		126 73	
Dyer and Williams	"	1	.	.	.	.	.	.	.	1	115,920		34 14	
Union Park Stable	"	1	.	.	.	.	.	.	.	1	176,776		37 36	
J. A. Tutien	"	1	.	.	.	.	.	.	.	1	150,180		31 25	
Daniel Curry & Co.	Oil Works	1	.	.	.	.	.	.	.	1	111,841		23 08	
Chapman & Soder	Factory	1	.	.	.	.	.	.	.	1	44,799		9 39	
J. H. Wilkinson	Building	.	.	1	.	.	.	.	.	1	317,551		66 54	
Bisbee Iron Foundry	Foundry	.	.	1	.	.	.	.	.	1	237,406		48 84	
Boston Rubber Co.	Factory	.	.	1	.	.	.	.	.	1	812,206		171 07	

Geo. B. Guild & Co.	Store	.	.	.	.	.	.	.	1	1	105,250		23 24	
Samuel Cabot, Jr.	Ammonia Works	1	.	.	.	.	.	.	.	1	107,431		22 51	
George E. Downes	Salt Works	1	.	.	.	.	.	.	.	1	249,309		53 01	
Magee Furnace Co.	Foundry	.	.	1	.	1	.	.	.	2	1,612,258		338 71	
Winnisimmet Ferry Co.		.	.	.	.	.	1	.	.	1	1,992,428		428 91	
T. McCullough	Tannery	1	.	.	.	.	.	.	.	1	133,395		26 68	
Hawthorn School		.	1	.	.	.	.	.	.	1	235,601		61 98	
												17,618,193		3,742 99
SOMERVILLE SUPPLY.														
W. K. Lewis Bros.	Pickles	1	.	1	.	.	.	.	.	2	697,043		148 89	
Skilton, Foot & Co.	"	1	.	.	.	.	.	.	.	1	664,034		138 40	
Thomas Emerson	"	.	.	1	.	.	.	.	.	1	421,081		87 78	
Amos Haynes	Vinegar Works	3	.	.	.	.	.	.	.	3	251,386		52 46	
M. Durant & Son	"	1	.	.	.	.	.	.	.	1	140,625		31 46	
Reitenbach Bros. & Mink	Factory	.	.	1	.	.	.	.	.	1	482,012		103 69	
Chas. H. North & Co.	"	.	.	.	.	.	.	1	.	1	9,451,280		1,890 25	
J. J. Clapp & Co.	Grain Mill	.	1	.	.	.	.	.	.	1	87,069		17 87	
Sylvester & Co.	Spike Foundry	.	.	1	.	.	.	.	.	1	446,576		95 07	
Union Hall Building Co.	Building	.	1	.	.	.	.	.	.	1	150,540		32 00	
Union Horse Railway	Stables	1	.	1	.	.	.	.	.	2	299,657		62 20	
J. H. Ferris	Saloon	.	.	.	.	.	.	.	1	1	120,000		24 00	
American Tube Works	Tube Works	.	.	1	.	1	.	.	.	2	1,283,687		271 11	
Amount carried forward		.	.	.	.	.	.	.	.	.	14,494,990	143,373,403	2,955 18	$30,420 90

METER STATEMENT. — *Concluded.*

Name.	Class.	⅝ inch.	¾ inch.	1 inch.	1½ inch.	2 inch.	3 inch.	4 inch.	Indicator.	Total.	Gallons.		Revenue.	
Amount brought forward		.	.	.	.	.	.	.	.	.	14,494,990	143,373,403	2,955 18	30,420 90
SOMERVILLE SUPPLY.— *Continued.*														
Middlesex Bleachery		.	.	.	.	.	.	1	.	1	7,879,875		1,877 61	
Somerville Flour Mills	Grain Mill	.	.	1	.	.	.	.	.	1	178,643		36 05	
Fitchburg Railroad Co.	Paint Shop	1	.	.	.	.	.	.	.	1	181,425		38 07	
H. A. Pratt	Stable	1	.	.	.	.	.	.	.	1	251,033		51 58	
Boston, Lowell, and Nashua Railroad Co.	Cattle Station	.	.	.	1	.	.	.	.	1	248,775		52 14	
Central Savings Bank	Building	.	.	1	.	.	.	.	.	1	234,894		49 28	
Prescott School		.	.	.	1	.	.	.	.	1	579,525		115 90	
Somerville Journal	Printing Office	.	.	.	.	.	.	.	1	1	363,000		76 50	
Edmund Durgin	Steam Shovel	.	.	1	.	.	.	.	.	1	302,958		60 59	
												24,715,118		$5,312 90
EVERETT SUPPLY.														
A. Cochrane & Co.	Chemical Works	.	.	2	.	1	.	.	.	3	3,830,882		808 33	
David Washburn	Brick Yard	.	.	1	.	1	.	.	.	2	455,341		91 00	
E. B. Spaulding	"	.	.	1	.	.	.	.	.	1	74,048		14 81	
George A. Sammett	Greenhouses, etc.	.	1	.	.	.	.	.	.	1	209,154		43 94	
												4,569,425		958 08
Total		.	.	.	.	.	.	.	.	.		172,657,946		$36,691 88

The East Boston meter accounts are included in the tabular statement in the report of the Water Registrar of the Cochituate Water Department.

Statement showing the amount of water-rates received since the introduction of Mystic-pond water, November 29, 1864: —

Charlestown District,		1865 . . .	$27,043 10	
"	"	1866 . . .	47,247 16	
"	"	1867 . . .	60,188 83	
"	"	1868 . . .	68,815 32	
"	"	1869 . . .	74,369 81	
"	"	1870 . . .	82,230 79	
"	"	1871 . . .	87,259 70	
"	"	1872 . . .	97,727 36	
"	"	1873 . . .	99,455 66	
"	"	1874 . . .	111,420 30	
"	"	1875 . . .	118,568 00	
"	"	1876 . . .	116,271 17	
"	"	1877 . . .	109,963 25	
"	"	1878 . . .	104,174 76	
"	"	1879 . . .	98,313 88	
"	"	May 1, 1880 . . .	74,641 49	
				$1,377,690 58
East Boston,	net,	1870 . . .	$39,870 22	
"	"	1871 . . .	45,022 98	
"	"	1872 . . .	49,574 38	
"	"	1873 . . .	53,488 41	
"	"	1874 . . .	53,654 08	
"	"	1875, 10 mos.	49,153 73	
"	"	1876 . . .	50,228 04	
"	"	1877 . . .	46,982 40	
"	"	1878 . . .	48,553 33	
"	"	1879, 7 mos.	24,026 84	
"	"	May 1, 1880 . . .	40,084 03	
				$500,638 44
Chelsea,	net,	1868, 6 mos.	$3,087 88	
"	"	1868–69 . .	16,615 92	
"	"	1869–70 . .	22,179 41	
"	"	1870–71 . .	25,871 17	
"	"	1871–72 . .	31,535 62	
"	"	1872–73 . .	34,067 65	
"	"	1873–74 . .	36,118 61	
"	"	1874–75 . .	39,886 61	
"	"	1875–76 . .	40,060 54	
"	"	1876–77 . .	39,425 33	
"	"	1877–78 . .	39,147 60	
"	"	1878–79 . .	39,720 66	
"	"	May 1, 1880 . .	39,524 95	
				$407,241 95
Somerville,	net,	1869, 6 mos.	$5,586 73	
"	"	1870 . . .	11,211 40	
"	"	1871 . . .	17,023 74	
"	"	1872 . . .	21,220 11	
"	"	1873 . . .	25,698 11	
Amounts carried forward,			$80,740 09	$2,285,570 97

Amounts brought forward,			$80,740 09	$2,285,570 97
Somerville,	net,	1874 . . .	30,494 48	
"	"	1875 . . .	38,038 70	
"	"	1876 . . .	39,320 47	
"	"	1877 . . .	39,411 22	
"	"	1878 . . .	41,648 79	
"	"	1879 . . .	42,097 48	
"	"	May 1, 1880 . . .	38,347 21	
				350,098 44
Everett,	net,	1872–73 . .	$3,062 83	
"	"	1873–74 . .	3,710 96	
"	"	1874–75 . .	3,975 95	
"	"	1875–76 . .	4,982 52	
"	"	1876–77 . .	5,566 12	
"	"	1877–78 . .	6,291 70	
"	"	1878–79 . .	6,314 70	
"	"	May 1, 1880 . .	6,186 83	
				40,091 61
The aggregate amount to May 1, 1880				$2,675,761 02

Respectfully,

JOSEPH H. CALDWELL,

Mystic Water Registrar.

REPORT OF THE SUPERINTENDENT OF THE WESTERN DIVISION.

Chestnut Hill Reservoir,
May 1, 1880.

Leonard R. Cutter, Esq., *Chairman Boston Water Board:* —

Sir, — In compliance with the rule of the Board, I submit herewith the annual report of this department for the past official year.

Lake Cochituate.

On the 1st of May, 1879, the surface of the lake stood at elevation 133.78, — 12 ft. 9 in. above the bottom of the aqueduct, and within a few inches of high-water mark. On the 2d of May the stop-planks were partly taken out at the dam, and a small amount of water wasted; but, with this exception, there has been no waste of water during the year. The lake maintained its height until the middle of June, when it gradually, but steadily, declined until Dec. 29, at which time the surface reached grade 126.41, the lowest point touched during the year. On the 15th of January the lake stood at 127.14, and, owing to the shutting down of the head-gates of the Cochituate aqueduct for a month, and an abundance of rain, the surface rose at the rate of about a foot a week. On the 16th of February the gates were again opened and water drawn from the lake to the city, notwithstanding which the water has risen as high as it is thought best to keep it with our present facilities for overflow.

No great amount of water has been drawn from the Sudbury source into the lake, — only 718,700,000 gallons in all, — and this has been received in course of some experiments on the flow of water through the Sudbury aqueduct.

A large amount of new work has been accomplished at the lake during the past year. Two new dams have been built to flow portions of the lake which are exposed at low water: one at the mouth of the Pegan or Hanchett meadows, and the other at the crossing of the Central Turnpike in Natick, to control the meadows south of that road. Both of these improvements were very much needed, and will probably accomplish more to maintain the purity of the water than

any other similar expenditure could have done. Both of these dams were thoroughly built by day's labor. The sluices were formed of piling with stop planks to control the water, and the exposed faces were either paved or rip-rapped.

A large amount of work has been done at the mouth of Pegan brook. By order of the Board in December last, I rebuilt the large filtering dam and replaced the sluices in both dams. The latter were so rotten as to be untrustworthy. These sluices were both rebuilt of chestnut.

Advantage was taken of the low stage of water to clean out the settling basins. About four thousand loads of deposit were removed from the two basins; the sides were entirely regraded, the growth of trees removed, and the borders covered with clean gravel, which gives a different look to this portion of the lake.

Notwithstanding the Board has done all in its power to neutralize the effect of the bad water from Pegan brook, this great evil still remains.

On October 28th I was directed by the Board to report to them the names of all parties polluting the lake within the limits of the town of Natick, with a description of the premises. On November 28th the report was made, and the Board proceeded at once to take action against the pollutors under the statute of 1878. The parties, nearly 100 in number, were duly notified; and on Feb. 7th proceedings were begun against some of them before the State Board of Health. The hearings took place on March 5th and March 20th. The cases are now pending.

The only other serious trouble threatening the lake water at present comes from the Reformatory Prison in Sherborn, and the State has already done much to alleviate this nuisance. A series of pipes supplied from large "field-tanks" has been built to filter the sewage through the natural earth. The effluent water is quite clear, and a great improvement over the very bad condition of things at the time of the last report.

A new slope wall was built during the winter on the middle division of the lake; the Pond-street culvert was rebuilt by contract during the latter part of the summer.

As we have always had more or less trouble at the dams at the outlet of the lake, during freshets, I have made a series of investigations into the actual state of the dams, their capacities under various circumstances; and some borings have been made to determine the best site for a new dam, should one be decided on.

The result, together with plans of the existing structures, have been sent to the City Engineer.

Until a new dam can be built I would suggest the following changes in the existing structures: —

First, the removal of the weir and brick-work at the lower dam, and a better arrangement of stop-planks. Second, the building of a foot-bridge at the upper dam, and a modification of stop-planks to be controlled from the bridge. With these alterations and precautions in the management of the lake at times of high water much greater safety will be insured than at present, and the cost will be trifling.

The other structures at the lake are in their usual condition.

There is a question now pending between the city and the town of Natick as to who shall maintain Willow bridge.

Dug and Dudley Ponds.

We have drawn no water from Dudley pond during the year, and very little has been received by overflow from Dug pond.

The Cochituate Aqueduct.

Six feet of water were run in this aqueduct from May 1st till Sept. 10th; and eight feet from Sept. 10th to Oct. 7th; the latter making a head of 20 inches over the top of the conduit. From Oct. 7th the head gates were wide open, and the water followed the surface of the lake with a certain loss of head until Jan. 15th, when, with the authority of the City Engineer, I proceeded to make some repairs on the upper portions of the aqueduct, and for that purpose the water was shut off. A well was sunk a short distance from the lake, with the intention of lowering the ground water below the bottom of the aqueduct; after this was accomplished, the plan was to take out the invert, and after concreting the foundation to replace the invert. Owing to the rapid rise of the lake, and the inability to keep the water down at reasonable expense by pumping, the attempt was abandoned on Feb. 17th, and the gates reopened. The well remains for another trial whenever the lake is low.

The head gates, which control the water from the lake, were found so leaky that they were taken out, repaired, and made tight.

Since Feb. 17th we have run but five feet of water in the aqueduct or elevation 126.00.

The line of the aqueduct has been cleared of growing timber during the year, whenever the men were not engaged in more pressing work. Extensive repairs will soon have to

be made on the culverts and other structures on the line of this conduit. The catch-basins were cleaned out during the past year.

Sudbury–River Aqueduct.

This structure is in excellent condition. It has sent to Chestnut-Hill reservoir during the year about 4,000,000,000 gallons.

The banks have been well looked after, as it is important to get a good sodding started on them. The Board have authorized me to fence portions of the line liable to be injured by cattle, and steps have already been taken in that direction. The gate-houses are in good condition. A careful examination of the interior of the conduit soon after it was put in my charge showed that many fine cracks existed in different portions of its length. They will probably never increase or become of any particular importance unless the structure should be strained beyond the design at some future time; but, for the purpose of ascertaining whether there were any changes taking place, however minute, at any point, I have put the interior in perfect order. For this purpose the bottom cracks have been dug out and pointed thoroughly, and the top cracks when they were of the thickness of a sheet of paper have been simply painted over with from two to three coats of American cement put on with a brush. This is done very rapidly, and has shown that, with one or two exceptions, there has been no further change since the repairs were made.

The small springs have been stopped by calking with sheet lead. The cracks in the bottom were repaired with Portland cement, mixed $\frac{1}{3}$ sand, $\frac{2}{3}$ cement. The whole of the interior is now in perfect order from the terminal chamber to Course brook.

The upper portion of the aqueduct from Farm pond to Dewing's cut has been scraped and thoroughly cleaned. The inside was coated, for a large portion of this distance, with a deposit of lime, which was almost as hard as enamel, and in places nearly an inch in thickness. After this substance was chiselled and scraped off, the brick-work was washed and swept as clean as possible. The washing was completed as far as Bacon's waste weir.

Culverts Nos. 7, 8, 9, 10, 11, and 12 have been pointed, and all the iron-work in the gate-houses painted during the year.

On July 8th, I was directed to open a street over the conduit from Mr. Chas. P. Clark's land, in Newton Centre, over

land of Rev. S. F. Smith, which was accomplished, during the following month, to the satisfaction of all parties concerned.

Chestnut-Hill Reservoir.

In April last a disease appeared among the fish in the reservoir. It was principally confined to the horn-pouts, of which there are large numbers. It was noticed at first that individual fishes appeared to be laboring under some trouble. They would float about near the surface in a weak condition. There were large white blotches on their sides and backs, and sometimes the fish would be worn almost to a skeleton before succumbing to the disease. Numbers were taken out from the slope walls on the sides of the basins, into which they had run their heads.

Soon afterwards large schools of horn-pouts could be seen swimming slowly around the reservoir near the surface, and all apparently affected.

Professor W. R. Nichols, of the Mass. Institute of Technology, was engaged to investigate the trouble, and it was found that the disease from which they were suffering was a vegetable parasite which attaches itself to the skin of slow-moving fishes, and grows feeding on the body. Large quantities of the fishes must have recovered, as in the course of a few weeks the disease disappeared.

The structures connected with the Chestnut-Hill reservoir are all in good order. I know of no repairs of importance that will be required at this point during the coming year.

The grounds are showing finely the results of past labor. The plan has been kept up of planting small and inexpensive trees for future effect.

The 48-inch main around the reservoir has been used for the first time to supply the city directly during some experiments made in November and December to determine the exact consumption.

The Cochituate water was shut off from this reservoir for almost three weeks in the fall and early part of the winter, and was run through the Brookline reservoir independently of the Sudbury. This was done to guard against some threatened troubles of a vegetable nature, which however disappeared, and the Sudbury and Cochituate are now mixed in nearly equal quantities in the distribution.

For several years past I have been making experiments on rain gauges placed in various positions at Chestnut-Hill reservoir. While enough has not been done to add much to the literature of the subject, yet sufficient data have been

collected to show that it is of the greatest importance to have some uniformity throughout the country in observation on the rainfall. It is proved beyond doubt that at the level of the ground much more rain can be collected than at a short distance above the surface. At Chestnut Hill I have collected 17 per cent. less rain at a height of 25 feet than at a height of $2\frac{1}{2}$ feet, this being the average for one year's observations. In England, the height of one foot has been very generally adopted as the proper position for a gauge. There are practical difficulties with this height in our climate, and it has seemed to me that two feet and one-half is a good height for us. If all gauges were so placed, relative comparisons would be of real value. Good results have been secured with a gauge of 14.85 in diameter. A hundred ounces in a gauge of this size makes an inch of rain, and great accuracy is secured by weighing. One difficulty is to secure a river of good section whose shape will not be easily changed. It would be desirable to have them all furnished from some central source. As a great many observations are now made on rainfalls by water works throughout the country, it is to be hoped that some uniformity will be arrived at.

The following table shows the rain-fall at Chestnut-Hill reservoir for the year 1879: —

Table of Rainfall at Chestnut-Hill Reservoir,[1] *for the year ending Dec.*, 1879.

Date.	Inches.	Snow or rain.	Duration.	Date.	Inches.	Snow or rain.	Duration.
Jan. 2	.39	Snow	7 a.m. to 7 p.m.	Feb. 9	.01	Snow	9 a.m. to 1.15 p.m.
" 9	.90	"	4 a.m. to 7.30 p.m.	" 11	1.30	Rain	6 p.m. to 10.45 a.m.
" 11	.02	"	8 to 9.30 p.m.	" 12			
" 16	.68	"	4.30 a.m. to 6.30 p.m.	" 17	.66	Snow	3 p.m. to 7 p.m.
" 20	.08	"	1 to 4 a.m.	" 18			
" 21	.01	"	8.45 to 11.45 p.m.	" 19			
" 27	.02	Mist	3 p.m. to 8.45 a.m.	" 20			
" 28				" 22	.01	"	5 to 7 p.m.
				" 25	.37	"	2.20 to 10 p.m.
Total .	2.10	. . .	. . . . .	" 26	.49	Rain to Snow	8.40 p.m. to 2. a.m. 6 to 7.20 a.m.
				" 27			
Feb. 5	.18	Snow	3 p.m. to 1 a.m.	Total .	3.02	. . .	. . . . .
" 6							

[1] Three gauges have been kept during the year, but the quantities in this table are from a gauge 14.85 inches in diameter, 2 feet 8 inches above the surface of the ground, and well placed in a very large open yard, unsurrounded by buildings or other obstructions. The duration of rainfall has been marked by observers and checked from a self-recording gauge which records to within five minutes. — D. FitzGerald.

Correction.—On page 126, 17th line from top, read "rim" instead of "river."

Table of Rainfall at Chestnut-Hill Reservoir. — CONTINUED.

Date.	Inches.	Snow or rain.	Duration.
Mar. 6	.22	Snow	12.30 to 8 p.m.
" 9	.08	Rain	5.15 to 8.30 a.m.
" 11	.01	"	7.15 to 9.30 a.m.
" 14	.14	"	3.15 to 9.30 p.m.
" 17	.45	Snow	4 to 11.45 a.m.
" 18	. .	Showers & Snow	11.45 a.m. to 12.15 a.m.
" 21	.14	Snow Rain	4 to 10.15 a.m. 10.15 a.m. to 3.15 p.m.
" 22	1.075	Snow	5.25 to 6 p.m.
" 23		Rain	6 p.m. to 9.45 a.m.
" 27	1.12	Snow and	7 a.m. to
" 28		Rain	3.30 p.m.
" 30	.265	Rain	5 to 8.45 a.m.
" 31	.065	Snow	12.30 p.m. to 2 a.m. April 1.
Total .	3.565	. . .	. . . . .
April 3	.205	Rain and Snow	4 p.m. to 9.45 p.m.
" 10	1.58	Rain and Snow	2.30 p.m. to 5.30 a.m.
" 11	.02	Snow	Snow in p.m.
" 15	.27	Rain	3.30 p.m. to
" 16			3 a.m.
" 17	1.915	Rain	6 a.m.
" 18		and	to
" 19		Snow	7 p.m.
" 25	.035	Rain	5 to 6.30 a.m.
" 29	.54	"	12.15 to 9 a.m.
	1.09	"	4.15 p.m. to 10 a.m.
" 30	.36	"	9.55 to 11.15 p.m.
Total .	6.015	. . .	. . . . .
May 16	.03	Rain	1 to 7.15 a.m.
	.10	"	9.30 to 5.15 p.m.
" 19	.68	"	7.30 a.m. to 2.30 p.m.
	.04	"	8 to 8.30 p.m.
Total .	.85	. . .	. . . . .
June 2	1.38		5.10 p.m.
" 3		Rain	to
" 4			3 p.m.
" 5	.09	"	4.40 to 5.05 p.m.
" 6	.18	"	5.10 to 5.45 p.m.
" 10	.05	"	2.50 to 3.15 a.m.
	.07	"	7.45 p.m. to
" 11	. .	. . .	5 a.m.
" 13	.07	"	1 to 3 a.m.
" 15	.71	Showers.	6 a.m. to
" 16			2 p.m.
" 26	.17	Rain	11.40 a.m. to 12 m.
" 28	.14	"	3.55 to 4.05 p.m.
	.11	"	6.45 p.m. to 1.30 a.m.
" 29	1.41	"	2.30 to 6 p.m.
" 30	.39	"	1.35 to 1.55 p.m.
Total .	4.77	. . .	. . . . .
July 3	.01	Rain	5.20 to 5.25 p.m.
" 4	.12	"	4.15 to 5 p.m.
" 7	.72	"	12.30 p.m. to
" 8			11 a.m.
" 12	.04	"	12.45 to 2 a.m.
" 16	.73	"	4.05 to 5.15 p.m.
" 18	.04	"	3.45 to 4.30 p.m.
" 22	.23	"	1.45 to 2.05 a.m.
	.12	"	11.10 to 11.35 p.m.
" 26	1.02	"	1.45 p.m. to
" 27			5 a.m.
Total .	3.03	. . .	. . . . .
Aug. 8	.11	Rain	4 to 9 a.m.
" 16[1]	6.23		7.35 a.m.
" 17		"	to
" 18			
" 19			6.30 a.m.
" 24	.40	"	3.45 to 4.05 p.m.
" 25	.31	"	1.15 p.m. to
" 26			8.15 a.m.
" 29	.10	"	10.05 to 11.05 p.m.
Total .	7.15	. . .	. . . . .

[1] Either misty or sprinkling during the whole of these three days. My self-recording gauge 25 feet above ground showed 3.5 inches from 2.50 p.m., Aug. 18, to 3 a.m., Aug. 19, which probably represents something less than 90 per cent. of the rainfall at the surface of the ground.

Table of Rainfall at Chestnut-Hill Reservoir. — CONCLUDED.

Date.	Inches.	Snow or rain.	Duration.
Sept. 4	.68	Rain	1.30 to 6.45 a.m.
" 8	.48	"	3.20 to 11.30 a.m.
" 14	.27	"	3 a.m. to 6.15 p.m.
" 16	.07	"	7.45 a.m to 7.45 p.m.
" 24	.38	"	2.25 to 6.30 p.m.
Total .	1.88	. . .	. . . . .
Oct. 11	.09	Rain	3.45 to 11 a.m.
" 19	.26	"	3.15 to 8.45 a.m.
" 22	.02	"	4 to 6.15 a.m.
" 28	.40	"	10.50 a.m. to 8 p.m.
Total .	.77	. . .	. . . . .
Nov. 3	.39	Snow	6.10 a.m. to 10 p.m.
" 7	.18	"	10.30 a.m. to 5.30 a.m.
" 8			
" 12	.46	Rain	5 p.m. to 3.45 a.m.
" 13			
" 18	.83	Rain and Snow	6.45 a.m. to 6.10 p.m.
" 20	.31	Snow	5 a.m. to 5.45 p.m.
Nov. 23	.03	Rain and Snow	4.45 a.m. to 7.30 a.m.
" 29	.51	Rain	1.30 a.m to 3 p.m.
Total .	2.71	. . .	. . . . .
Dec. 4	.15	Rain	1.30 to 7.30 a.m.
" 6	.48	"	1 p.m. to 7.30 a.m.
" 7			
" 8	.11	"	11.30 a.m. to 3.45 p.m.
" 10	.13	"	8.30 p.m. to 8.30 a.m.
" 11			
" 14	1.19	Rain and Snow	7.30 a.m. to 2 a.m.
" 15			
" 19	.03	Snow	7 a.m. to 3 p.m.
" 20	.01	"	7.30 to 10.30 a.m.
" 22	.62	"	1.45 a.m. to 9 p.m.
" 24	.57	Rain	5.15 a.m. to 2 p.m.
" 25	.01	Snow	9.30 to 11.20 p.m.
" 29	.10	Rain	6 to 9.30 a.m.
" 31	.53	Snow	7.30 a.m. to 10 p.m.
Total .	3.93	. . .	. . . . .

Total for year . . . . . 39.79 inches

BROOKLINE RESERVOIR.

This reservoir is in the same condition as at the date of the last report. A great deal of work will have to be done to it after the new 48-inch main is laid. The basin should be cleaned out and the gate-houses thoroughly overhauled. The grounds are in good order.

The customary list of tools and other property is appended.

Respectfully submitted,

DESMOND FITZGERALD,

Superintendent.

LIST OF CITY PROPERTY ON THE WESTERN DIVISION.

1880.

Chestnut-Hill Reservoir.

Effluent Gate-House.

1 hand-pump, 1 12-ft. ladder, 1 10-ft. ladder, 2 wrenches, 100 ft. of hose, 120 ft. gas-pipe, 2 shovels, 1 rattan broom, 1 set evaporation apparatus, 4 stop-plank hooks, 1 blow-off wrench, 2 gate wrenches, 32 ft. galv. chain, lock, etc., 1 fountain nozzle, 33 stop-planks, 1 step-ladder, 5 pictures, 1 gauge, 1 thermometer, 1 broom, 2 brushes and dust-pan, 6 lanterns, hydraulic apparatus, 1 stove, stove-pipe, poker and hod, 1 settee, 1 mat, 1 nozzle, 3 oil-cans and tunnel, 1 hammer, 1 scrubbing-brush, 1 sponge, 1 window-brush, 2 wire scoops.

Terminal Chamber.

1 self-registering gauge, 1 broom, 1 settee, 1 dust-pan and brush, 1 stove, stove-pipe, poker and hod, 1 coal-box, 1 20-ft. ladder, 1 boat, 1 step-ladder, 4 lanterns, 1 duster, 3 oil-cans, 1 pair rubber boots, 1 iron rake, 1 reflector-lamp for boat, 1 mat, 2 stop-plank hooks, 25 stop-planks, 1 wire scoop.

Intermediate Gate-House.

18 stop-planks, 1 wrench.

Influent Gate-House.

26 long stop-planks for conduit, 14 stop-planks, 4 hooks, 1 extra brass screw.

Office.

1 safe, 3 desks, 6 chairs, 3 stools, 5 pictures, 1 telegraph instrument, 2 sets scales, 1 stove, 3 reflecting lanterns, 6 lanterns, 11 brooms, 1 hook-gauge, 2 inkstands, 4 thermometers, 2 copper pans, 3 tumblers, 2 kettles, 9 pairs rubber boots, 7 rubber coats and caps, 8 gauging-floats, 1 drawing-table, 1 sink, pump, wash-basin, and 8 towels, 1 automatic rain-gauge, 1 book-case.

Tool-House.

$\frac{1}{2}$ box glass, 1 copper elbow, $\frac{1}{2}$ bbl. lard oil and cans, $\frac{2}{3}$ bbl. kerosene oil and cans, 1 gall. sperm oil, 1 can glycerine,

12 bird-houses, 1 conduit reflector, 3 screen-doors, 75 lbs. waste, 24 padlocks, 18 boxes candles, 2 bars soap, ½ gross matches, 11 paint-brushes, 1 chimney brush, 5 whitewash brushes, 2 bunches tacks, 3 rolls wicking, 2 sheets rubber gaskets, 3 ice-chisels and hooks, 1 ice-saw, 2 glass floats, 1 Johnson pump, 12 window-screens 1 water-tank, 2 rain-gauges, 6 horse-bonnets, 2 shades, 7 draft-chains, 8 striking-hammers, 2 hand-hammers, 7 sledge-hammers, 2 paving-hammers, 2 axes, 4 screen-bars, 15 iron bars, 31 square shovels, 9 snow-shovels, 55 round-pointed shovels, 5 scufflers, 43 picks, 5 grub-axes, 34 pick-handles, 7 sledge-handles, 7 trowels, 17 rifles, 1 lot of cord, 9 hoes, 4 one-bushel baskets, 4 border-knives, 2 beadles, 5 paving-rammers, 1 root-puller, 3 manure-forks, 1 limb-cutter, 1 gaff-hook, 1 California pump-belt, 25 ft. wire fence, 2 pulleys, 2 mowing-machines, 18 drills, 1 copper tamping-rod, 2 iron spoons, 2 whetstones, one wooden pulley, ½ can palm-oil, 1 screen-brush, 6 bags grass-seed, 5 lbs. oakum, 7 dozen hay-caps, 1 rubber tank-hose, 1 box candlesticks, 1 writing-desk, 1 cross-cut saw, 4 small tin dippers, 12 pails, 5 heavy buckets, 1 tin boiler, 1 hay-knife, 50 ft. fuse, 4 sponges, 1 grate, 5 lbs. powder, 3 spades, 14 points, 3 chisels, 3 grass-hooks, 3 watering-pots, 3 feed-baskets, 75 lbs. lead, 6 rattan brooms 11 snaths, 14 iron rakes, 19 wooden rakes, 12 hay-forks, 2 hay-ropes, 1 oil cabinet, 25 lbs. axle grease, 4 rubber blankets, 12 kegs nails, 6 plow-points, 1 cement testing-machine, 1 piece brass screen, and 1 piece copper screen.

Old Blacksmith's Shop.

1 observatory and instruments, 2 pieces canvas, 1 pair oars, 2 boats, 1,000 shingles, 1 flume, 1 post-spoon, 1 iron cover, 10 bbls. Portland, 23 bbls. American cement, ¼ bbl. black oil, 1 lot crusher-plates, 2 large screens, 12 signs, 1 iron bedstead, ¼ bbl. paint, 1 manhole grate, ½ cask red paint, 1 house force-pump, 1 lot of chains, 3 stoves, 20 ft. lead pipe.

Stable.

8 horses, 2 pigs, 8 horse-blankets, 1 rubber horse-cover, 2 sets double harness, 1 hay-rigging harness, 2 express harnesses, 2 driving-harnesses, 9 halters, 4 cart-harnesses, 1 harness-pan, 1 gall. neat's-foot oil, 1 Johnson pump, sleigh-bells, 2 surcingles, 1 stove, 1 stable-sponge, 4 curry-brushes and combs, 1 set lead chains, 1 hay-cutter, 1 knee-pad, 40 bushels oats, 1 bushel cracked corn, 3 bushels shorts, 10 tons hay, 2 brooms, 2 bales straw, 2 open buggies, 1 covered buggy, 1 buffalo and lap robe, 1 duster, 1 jack, 1 watering-pot, 1 whip.

Carpenter's Shop.

1 stove, 1 clock, 30 ft. clear white-pine, 100 ft. ash, 400 spruce clapboards, 3 hand-saws, 1 panel-saw, 1 bit-stock and bitts, 1 level, 8 planes, 3 augurs, 1 pair dividers, 6 chisels, 2 axes, 2 gauges, 20 fence-rails, 4 × 4, 1 wood-saw, 1 water-tank, 400 lbs. nails, 1 lot screws, 1 hammer, 1 compass-saw, 12 eye-bolts, 1 fence-wrench, 2 ladles, 2 rubber belts, 2 jack-screws, 15 lbs. green paint, 1 can japan, 2 galls. boiled linseed-oil, 5 galls. raw linseed-oil, 5 brushes, 1 gall. black paint, 1 gall. varnish, ½ can spirits turpentine, 3 cans paint preserver, 1 grindstone, 1 galv. chain and pulley, 1 belt-stretcher, 1 rotary-pump, ½ ton hard coal, ¼ ton soft coal, 1 Blake pump, 1 portable boiler, 1 roll brown paper, 1 feed-pump, 1 portable engine, 1 glue-pot.

Blacksmith's Shop.

1 forge, 1 anvil, 1 set tools, 1 vise, 1 breast-drill, 3 stock-dies and taps, 1 ratchet and drill, 10 files, 75 lbs. iron, 200 lbs. scrap-iron, 4 pairs pipe-tongs, 2 solid die-plates, 75 ft. steam-pipe, 3 cold chisels, 2 monkey-wrenches, 1 soldering-iron.

Yard.

1 derrick and rigging, 1 Blake stone-crusher, 1 12-horse power engine, 2 cans, 1 portable building and shed, 60 ft. 4-inch suction-pipe, 1 piece of lead suction-pipe (siphon), 1 piece of 18-inch copper suction-pipe, 30 ft. of 4-inch iron suction-pipe, 12 ft. 8-inch drain-pipe, 8 ft. 6-inch drain-pipe, 6 ft. 30-inch drain-pipe, 15 fire-buckets, 1 carryall, 1 sleigh, 2 express wagons, 1 2-horse wagon, 4 carts, 2 water-carts, 1 hay-wagon, 1 pung, 2 2-horse sleds, 1 2-horse truck, 2 drags, 1 1-horse water-cart, 2 road-rollers, 1 pair large wheels, 2 moving wheels, 4 roller-wheels (1 horse-power), 2 hand-carts, 1 spare pole, 2 hand-rollers, 2 sets lead bars, 1 fire-engine, 2 jacks, 2 conduit forms, 1 step-ladder, 1 30-ft. ladder, 1 28-ft. ladder, 1 20-ft. ladder, 2 12-ft. ladders, 2,000 bricks, 2 tons sand, 1 lot cast-iron grates, 1 lot clay, 1 scraper, 2 snow-ploughs, 1 plough, 1 harrow, 55 granite-bounds, 5 cedar-posts, 1 rain gauge, 6 gravel-screens, 12 wheelbarrows, 125 pickets, 1 tool-box, 1 lot of old cast-iron.

Brookline Reservoir.

1 writing-desk, record-book, ink-rack, etc., 1 gauge, 1-stove, stove-pipe (32 ft.), hod and poker, 1 pitcher, 1 tumbler, 1 spittoon, 1 lantern, 1 stove-brush, 2 settees, 4 stop-

plank hooks, 2 towels, 2 mats, 1 pair rubber boots, 1 scythe, 3 shovels, 1 pick, 1 dust-brush, 2 rakes, 1 hoe, 1 sickle, 1 scuffler, 2 water-pails, 1 13-ft. ladder, 1 step-ladder, 1 sponge, 1 pair hedge-shears, 1 dust-pan, 1 feather duster, 1 bushel basket, 1 border knife, 1 wheelbarrow, 1 spade, 1 broom, 1 screen-brush, 1 rattan-broom, 2 scrubbing-brushes, 1 watering-pot, 1 axe, 1 chair, 1 wrench, 1 40-inch gate-key, 9 ft., 2 36-inch gate-keys, 4 ft., 1 30-inch gate-key, 6 ft., 2 air-cock wrenches, 2 gate-wheels, 1 gate-cover, 1 gate-crank, 2 gate-chamber wheels, 38 stop-planks, 3 ft. $3\frac{1}{2}$ inches $\times$ 8 inches, 18 stop-planks, 4 ft. 5 inches $\times$ 8 inches, 33 stop-planks, 5 ft. 6 inches $\times$ 8 inches, 3 gas fixtures, 1 frame for gates, 1 rammer, 4 keys for 48-inch connection, 1 wrench, iron cover and wooden cover for 48-inch connection, 1 crow-bar, 3 thermometers, 5 padlocks, 2 screen-doors, 6 window-screens, 6 screens, $5\frac{1}{2} \times 5$ ft., 1 iron ladder, $7\frac{1}{2}$ ft., 4 signs, 1 hammer, 1 cold chisel.

Lake Cochituate.

1 25-horse-power engine, 3 18-inch pumps, 1 12-inch pump, 4 stop-plank hooks, 2 1-inch hooks, 1 box bolts and pieces steam-pipe, 2 pieces boiler-plate, 1 dining-room table, 12 dining-room chairs, 1 small table, 1 mirror, 1 stove, 1 oil-cloth carpet, 2 spittoons, 2 record-books, 1 bowl and slab, 1 steelyards, 1 horse, 1 wagon, 1 light wagon (worthless), 1 cart, 1 pung, 3 harnesses, 1 rain-gauge, 38 stop-planks, 1 screen for gate-house, 4 hoes, 1 scythe, 2 pieces rubber hose, 1 rope, 2 gravel screens, 1 drain-mould, 1 lot of corrugated iron, 4 rattan brooms, 6 candlesticks, 2 grindstones, 1 grappling-iron, 1 boat-hook, 1 raft, 2 square-pointed shovels, 2 snow-shovels, 2 round-pointed shovels, 10 picks, 2 grub-hoes, 2 stone hand-trucks, 4 ox-chains, 1 short chain, 2 rakes, 2 white-wash brushes, 1 saw, 1 hammer, 1 roll telegraph-wire, 1 sledge, 1 striking hammer, 1 road-roller, 9 bbls. cement, 1 pair hedge-shears, 2 sickles, 2 hay-forks, 1 manure-fork, 50 stone-bounds, 4 pails, 1 pair oars, 2 sand-sieves, 6 hand-drills, 2 hand-drill hammers, 6 steel points, 1 axe, 1 hatchet, 2 iron settees, 1 keel-bottom boat, 1 set small scales, 1 lot of scrap-iron, copper and lead, 3 pairs rubber boots, 1 copper sand-pump.

Farm Pond Gate-House.

$1\frac{1}{4}$ tons coal, 2 pails, 2 wrenches, 1 22-ft. ladder, 4 stop-plank hooks, 3 yds. linen, 8 candles, 2 tin-pans, 4 cans, 2 ropes, 3 qts. kerosene oil, 1 boat, 3 lamps, 3 reflectors, 3 globes, 2 weir-gauges with apparatus, 2 wrenches for hoist-

ing gates, 1 crow-bar, 1 scuffler, 1 wire scoop, 3 conduit reflectors, 4 double blocks with ropes, 39 ft. rubber hose, 1 thermometer, 1 brass handle, for current-metre.

Office at Framingham.

6 bbls. American cement, ½ bbl. Portland cement, ½ bale oakum, 1 roll sheet lead, 5 hand-saws, 2 planes, 1 level, 2 hammers, 1 steel square, 4 bitt-stocks, 5 augurs, 11 bitts, 1 bevel, 3 screw-drivers, 2 wrenches, 1 marlin spike, 2 chisels, 1 carpenter's tool-chest, ½ keg nails, 4 pails, 1 ice-pick, 2 swivel screen-hangers, 3 testing-irons, 5 cans, 12 eye-bolts, 11 iron dogs, 16 iron steps, 22 bags, 1 tent, 1 grindstone, 1 water-can, 1 cement testing apparatus, 1 bbl. bungs, lot of old iron, 1 ladle, package brimstone, 15 shovel-handles, 1 pair chain dogs, 1 single block, 100 wooden pins, 1 coil of wire, 494 ft. old rubber hose, ½ keg spikes, 1 rammer, 12 picks, 1 grub-hoe, 3 shovels, ½ box red paint, 1 ice-chest, 1 tool-box, 22 files, 1 tack-hammer, 1 wash-stand, 7 oil-cups, 4 padlocks, 1 tool-chest, iron pipe and fittings, 2 2-gall. measures, 2 reflecting-lanterns, 4 lanterns, 5 lantern-globes, 1 gall. kerosene oil, 2 tunnels, 3 galls. sperm oil, 2 brands, 7 galls. Page's varnish, 2 sledge-hammers, 5 axes, 4 brass bolts, 1 wooden maul, 11 picks, 1 wood-saw and horse, 14 hammer-handles, 2 bdls. lathes, 3 mortar and 12 brick hods, 1 stove, 3 ice-tanks, 8 manure-forks, 8 small stone-hammers, 1 wooden rake, lot of leather belting.

Tool-House at Farm Pond.

10 picks, 12 grub-axes, 4 spades, 12 square-pointed shovels, 9 round-pointed shovels, 6 long-handle round-pointed shovels, 1 cross-cut saw, 1 hand-saw, 11 oars, 1 cylinder stove and pipe, ¾ keg shingle-nails, 4 kegs spikes, 6 augurs, 1 jack-screw, 1 axe, 1 sieve, 2 hoes, 1 oil-cup, 1 chisel-bar, 2 pinch-bars, 5 crow-bars, 4 tampers, 2 rammers, 1 sledge-hammer, 4 scale-chains, 2 drag-chains, 103 bolts, 3 ft. 6 inches long, 11 wheelbarrows, 49 rods, 12 ft. long, 5 kegs old spikes, 1 lawn pump, 1 14-ft. lever, 3 double blocks with ropes, 4 single blocks, 5 dredging-hooks, 5 ice-hooks, 2 mortar and 8 brick-hods, 8 wooden rolls, 1 truck, 3 steel sounding-rods, 2 bush-scythes, 1 snath, 4 iron truck-wheels, 50 ft. lead pipe, 1 gravel and 2 sand-screens, 1 wooden pump ½ bbl. cement, 1 can, 26 stop-planks, 7 ft. 6 in. × 8 inch × 4 inch, 80 stop-plank, 7 ft. × 8 inch × 4 inch, 48 bolts, 3 ft. 3 inches long, 30 bolts, 5 ft. 6 inches long, cast-iron pipe and 4 bends, 350 bolts assorted sizes, 66 stakes, current metre apparatus, 200 wooden pins, 15 ft. of

6-inch stove-pipe, 1 water-pot, 1 bdle oakum, 1 hoisting apparatus, lot of old iron, 2 iron rings, 1 iron dog, 1 drill, 1 tool-chest, 2 bunches cord, 1 lot rubber, 1 trowel, 2 wooden beadles, 1 tool-box, 4 oak-plank, 2 hammered granite stones, 1 truck, 1 boat, 1 wooden scale, lot of spruce lumber, lot of hard-pine lumber, lot of old lumber, 10 ladders.

Course Brook Waste Weir.

1 spade, 1 broom, 1 hoe, 2 stop-plank hooks with rope, 2 stop-plank hooks, 2 bags, 3 lanterns, 3 cans, 1 shovel, 1 piece of rope, 1 oil-cup, 4 pairs rubber-boots, 1 candle-stick, 1 can sperm-oil, 1 ice-chisel, 1 iron-rake, 1 hatchet, 3 wooden-horses, 1 conduit reflector, 2 paint-brushes, 4 pails, 1 wheelbarrow, 6 stop-planks, 9 feet 6 inches × 8 inches × 3 inches, 12 stop-planks, 4 cape-chisels, pile of old lumber.

Bacon's Brook Waste Weir.

3 iron-rakes, 1 spade, 4 bags, 3 square-pointed shovels, 4 grass-hooks, 2 pairs rubber-boots, 1 hand-barrow, 1 piece canvas, 1 wheelbarrow, 1 pick, 1 culvert-scoop, 1 long-handle round-pointed shovel, 3 cans, 1 lantern, 2 boxes candles, 2 stop-plank hooks, 12 stop-planks, 2 cement-boxes, 6 steel sets, 5 cape-chisels, 1 ice-chisel.

Rosemary Brook Blow-off.

1 gate-wrench, 1 ladder.

Fuller's Brook Waste Weir.

12 stop-plank, 9 feet 9 inches × 8 inches × 4 inches, 2 stop-plank hooks, 2 brooms, 1 can, 1 ice-chisel, 1 wheelbarrow, 2 pails, 1 bag.

Tool-shed, near Fuller's Waste Weir.

12 plank, 14 feet × 8 inches × 3 inches, 4,300 hard brick, 1 wheelbarrow, 1 round-point shovel, lot of old lumber.

West Siphon Chamber.

52 stop-planks, 6 feet × 8 inches × 4 inches, 1 coal-hod, 1 coal-box, 1 tool-chest, 1 gauge, 5 pair rubber-boots, 1 stool, 1 gate-hook, 1 hook for bolting door, 2 lanterns, 3 cans, 1 gallon Page's varnish, ½ can thinning, 1 sponge, 6 paint-brushes, 1 scrubbing-brush, 1 jug, 1 stove-brush, 3 calking-irons, 3 steel points, 1 dust-pan and brush, 6 brooms, 1 axe, ½ bag cotton waste, 1 2-bushel basket, 1 long-handle

round-pointed shovel, 3 square-pointed shovels, 2 candlesticks, 1 pail, 1 piece of rope, 1 ladder, 1 hoe, 1 closet, 4 stop-plank hooks, 2 wooden horses, 1 bag salt, 1 sieve, 2 cans paint, 1 mat, 1 bush-scythe, 1 grass-hook, 1 grub-axe, 1 crow-bar, 1 candle-reflector, 3 oil-cups, 1 keg nails, 2 globes, 1 augur, 1 hay-fork, 1 hand-saw, 1 hammer, 1 iron-rake, $1\frac{1}{2}$ bbls. sand, 3 bbls. cement, 1 bbl. Portland cement, 5 bags grass-seed, 7 boxes candles, 2 bags, 1 wheelbarrow.

East Siphon Chamber.

3 qts. paint, 1 broom, coil rope, 1 candle-stick, 1 closet, 1 flat-bottom boat, 52 stop-planks, 6 feet × 8 inches × 4 inches, 1 gauge, 2 stop-plank hooks, 1 wooden roller, 3 shovels, 1 wrench, 1 lantern, 3 iron-rakes, 2 pair rubber-boots, 1 spade, 2 grass-hooks, 1 bag.

Clarke's Waste Weir.

12 stop-planks, 2 stop-plank hooks, 1 broom, 1 shovel.

REPORT OF THE SUPERINTENDENT OF THE EASTERN DIVISION.

Boston, May 1, 1880.

Leonard R. Cutter, Esq., *Chairman Boston Water Board:*—

Sir,—My report for the year ending with April 30th I herewith respectfully submit.

I consider the works at the present date to be in excellent condition.

Main Pipes.

The whole number of feet of pipe of the different sizes laid during the year is . .	42,838 feet.
Relaid	2,785 "
	45,623, equal to $8\frac{3}{5}\frac{3}{2}\frac{8}{8}\frac{3}{0}$ miles.
Total number miles of pipes laid to date . .	$372\frac{2}{5}\frac{0}{2}\frac{5}{8}\frac{6}{0}$

Service Pipes.

Whole number put in	1,036
Length in feet	27,787
Pipes changed	124
Length in feet	1,606

Posts for Watering-Carts.

Established during the year	7
Total number now established	25

Location.

Blue-Hill avenue, corner Quincy.
" " near Warren.
Francis street, near Tremont.
Perkins street, near Centre.
Prince street, near Perkins.
Mt. Hope Cemetery.
Paris street, corner Meridian.

DRINKING–FOUNTAINS.

Established Sixth street, between P and Q.

"	fire-pipes	6
"	elevators	23
"	motors	6

Of the relaying of enlarged sizes, the following table shows the changes in sizes :—

Street.	Between what Streets.	Size now.	No. of feet.	Size form'ly
Harrison avenue . .	Curve and Beach	8-in.	1,700	6-in.
Dove	F and Dorchester	6 "	800	4 "
Rowe's Wharf . .	From Atlantic avenue	6 "	285	4 "

RAISED.

A st., Baldwin and end of pipe ..... 6-inch. 300 feet.
Cabot st., Tremont, and Windsor ..... 6-inch. 110 "

LOWERED.

Cabot st., Tremont and Windsor ..... 6-inch. 246 feet.

TAKEN UP.

6-inch iron pipe ..... 2,435 feet.
4 " " " ..... 926 "
2 " " " ..... 13 "
1½ " " " ..... 1,162 "
1 " lead " ..... 71 "
¾ " " " ..... 8 "
⅝ " " " ..... 280 "
½ " " " ..... 85 "

Statement of Location, Size, and Number of Feet of Pipe laid in 1879.

In what Street.	Between what Streets.	Diam. of Iron Pipe in In.	Feet of Pipe.
	BOSTON.		
Exeter	From Newbury	16	91
	Total 16-inch		91
Albany	Chester Park and Northampton	12	376
Newbury	Gloucester and Hereford	"	488
"	Hereford and Chester Park	"	60
Beacon	Junction of Brookline ave.	"	24
Gloucester	From Newbury	"	73
	Total 12-inch		1,021
Malden	Albany and Wareham	6	265
Bromfield	Tremont and Washington	"	163
Dartmouth	Buckingham and R.R. Bridge	"	36
"	Huntington ave. and R.R. Bridge	"	130
School and City Hall Ave.	Chapman place and Williams court	"	430
Newbury	Fairfield and Exeter	"	144
"	Dartmouth and Gloucester	"	1,500
Davenport	From Tremont	"	96
Auburn	Brighton and Poplar	"	168
Dartmouth	Huntington and B.&A.R.R.	"	130
Marlboro'	Fairfield and Hereford	"	10
	Total 6-inch		3,072
	SOUTH BOSTON.		
H	Emerson and Broadway	12	96
	Total 12-inch		96
I	Fourth and Fifth	6	337
Morni court	Ninth and O.C.R.R.	"	69
	Amount carried forward		406

Statement of Location, Size, etc.— Continued.

In what Street.	Between what Streets.	Diam. of Iron Pipe in In.	Feet of Pipe.
	Amount brought forward		406
	SOUTH BOSTON.— *Continued.*		
Old Harbor	Eighth and Ninth	6	209
Ninth	Old Harbor and Lowland	"	442
Watti court	Ninth and O.C.R.R.	"	379
N	Fourth and Broadway	"	366
	Total 6-inch		1,802
	EAST BOSTON.		
Falcon	Meridian and Border	6	160
"	Brooks and Meridian	"	100
Doherty court	Everett and Maverick	"	112
Pope	Saratoga and Curtis	"	152
Brooks	E. B. Reservoir and White	"	200
White	E. B. Reservoir and Brooks	"	60
	Total 6-inch		784
Sumner place	From Sumner	4	137
Harmony court	From Lexington	"	130
	Total 4-inch		267
	BOSTON HIGHLANDS.		
Swett	Gerard and Magazine	12	1,673
Norfolk ave	Dolan court and Oak	"	207
	Total 12-inch		1,880
Fairland	Winthrop and Moreland	6	349
New Heath	Centre and Pynchon	"	47
Gerard	Swett and Island	"	28
Swett	Gerard and Magazine	"	28
New	From Swett	"	58
Savin	Tupelo and Blue Hill ave	"	79
Oak	Norfolk ave. and Clapp	"	362
	Amount carried forward		651

Statement of Location, Size, etc. — Continued.

In what Street.	Between what Streets.	Diam. of Iron Pipe in In.	Feet of Pipe.
	Amount brought forward	.....	651
	BOSTON HIGHLANDS. — *Continued.*		
Shawmut ave	Vernon and Roxbury	6	19
Cobden	Washington and Walnut ave	"	88
Howland	From Warren	"	316
Cottage court	From Rand	"	167
Faxon place	Tremont and Smith	"	152
Reed court	Yeoman and Hartopp place	"	119
Bickford	Centre and Bromley park	"	43
Whitney	Tremont and Conant	"	441
Hoffman	Lamartine and Gilbert	"	222
Gilbert	Hoffman and Roys	"	281
Dolan court	From Norfolk ave	"	193
Maywood	Blue Hill ave. and Warren	"	106
Dale ave	From Dale	"	195
Court	From Day	"	166
Hulbert	Ray and Circuit	"	48
Hampshire	Vernon and Clay	"	34
Wyoming	From Warren	"	351
	Total 6-inch	.....	3,892
Court	Bickford and Parker	4	209
	Total 4-inch	.....	209
	DORCHESTER.		
Adams	Ashmont and Minot	12	1,552
Columbia	School-house and Wales place	"	583
Myrtle	Quincy and Lawrence ave	"	116
Norfolk ave	Cottage and Franklin court	"	298
Washington	Ashmont and Homer	"	274
Romsay	Dorchester ave. and Sagamore	"	424
Codman	Dorchester ave. and R.R. Crossing	"	775
	Total 12-inch	.....	4,022

Statement of Location, Size, etc. — Continued.

In what Street.	Between what Streets.	Diam. of Iron Pipe in In.	Feet of Pipe.
	DORCHESTER. — *Continued.*		
Glendale	Bird and Columbia	8	227
Melville ave	Washington and Allston	"	1,243
Monadnock	Bird and Dudley	"	1,448
Pleasant	Cottage and Pearl	"	949
Bowdoin ave	Washington and Eldon	"	527
	Total 8-inch		4,394
Grampian way	Savin Hill ave and Savin Hill ave	6	408
Ellsworth	Commercial ave. and Dorchester ave	"	317
Grant	From Crescent ave	"	57
Melville	Washington and Alston	"	9
Cedar ave	Bird and Monadnock	"	20
Clarence place	From Washington	"	148
Carlton	Crescent ave. and O.C. & N.R.R.	"	397
Cow Pasture	From Carlton	"	1,053
Woodward park	From Harlow	"	287
Harlow	Howard ave. and Woodward park	"	322
Clifton	Hudson and Cottage	"	395
Hudson	Clifton and Dudley	"	13
Columbia	Hancock and Glendale	"	397
Franklin court	From Norfolk ave	"	430
Hartford	Sargent and Howard ave	"	127
Sargent	Hartford and Howard ave	"	231
Virginia	Dudley and Davenport ave	"	364
Glendale	Columbia and Glen	"	246
Glen	Glendale and Trull	"	21
Brook place	From Dudley	"	293
Davenport ave	Columbia and Virginia	"	405
Baker court	From Willow court	"	253
Sumner-st. place	From Sumner	"	256
Highland	High and East	"	431
New	From Ashmont	"	156
	Amount carried forward		7,036

Statement of Location, Size, etc. — Continued.

In what Street.	Between what Streets.	Diam. of Iron Pipe in In.	Feet of Pipe.
	Amount brought forward		7,036
	DORCHESTER. — *Continued.*		
Sumner court	From Sumner	6	276
Bowdoin ave	Washington and Eldon	"	9
Codman	Dorchester ave. and R.R. Crossing	"	8
Ware	From Trull	"	120
Monadnock	Dudley and Bird	"	8
	Total 6-inch		7,457
	WEST ROXBURY.		
Park	Rutledge and Martin	12	1,212
Amory	School and Boylston	"	435
Poplar	Albion and Metropolitan	"	3,098
Metropolitan ave.	Poplar and Kilburn	"	242
Spring	Walnut and Clarence	"	306
Clarence	Spring and Prospect	"	493
	Total, 12-inch		5,786
Metropolitan ave.	Poplar and Hyde Park line	8	1,196
Annawan ave	Irving and Park	"	404
Perkins	Pond ave. and Prince	"	1,166
	Total 8-inch		2,766
Lakeville place	From Centre	6	691
Child	Starr and South	"	548
Lee	Keys and Child	"	36
Rutledge	Bellevue and Park	"	735
Ellsworth	From School	"	391
Poplar	Albion and Metropolitan ave.	"	24
Metropolitan ave.	Poplar and Hyde Park line	"	18
Park	Annawan and Martin	"	18
Warren square	From Green	"	159
New	From South	"	298
	Amount carried forward		2,918

Statement of Location, Size, etc. — Concluded.

In what Street.	Between what Streets.	Diam. of Iron Pipe in In.	Feet of Pipe.
	Amount brought forward	.....	2,918
	WEST ROXBURY. — *Continued.*		
Carolina ave.	South and Lee	6	253
Elm	Everett and Newberne	"	42
Perkins	Pond ave. and Prince	"	15
Court	From Perkins	"	208
Spring Lane	Lamartine and Chestnut ave	"	343
Amory	School and Boylston	"	10
Centre place	From Centre	"	256
	Total 6-inch	.....	4,045
Court	From Perkins	4	115
	Total 4-inch	.....	115
	BRIGHTON.		
Faneuil	Market and Brook	12	296
Parson	Faneuil and R.R. bridge	"	6
	Total 12-inch	.....	302
Allston sq.	From Allston	6	329
Griggs	From Allston	"	208
	Total 6-inch	.....	537
Court	From Washington	4	142
Academy-Hill ave.	From Rockland	"	158
	Total 4-inch	.....	300

RECAPITULATION.

SECTION.	1879-80.	DIAMETER OF PIPES IN INCHES.					
		16	12	8	6	4	Totals.
Boston	Total number of feet laid	91	1,021	.....	3,072	.....	.....
	Stopcocks in same	.....	5	1	13	2	.....
South Boston	Total number of feet laid	.....	96	.....	1,802	.....	.....
	Stopcocks in same	.....	1	.....	5	1	.....
East Boston	Total number of feet laid	.....	.....	.....	784	267	.....
	Stopcocks in same	.....	.....	.....	1	.....	.....
Boston Highlands	Total number of feet laid	.....	1,880	.....	3,892	209	.....
	Stopcocks in same	.....	2	.....	12	1	.....
Dorchester	Total number of feet laid	.....	4,022	4,394	7,457	.....	.....
	Stopcocks in same	.....	5	7	17	.....	.....
West Roxbury	Total number of feet laid	.....	5,786	2,766	4,045	115	.....
	Stopcocks in same	.....	5	4	7	.....	.....
Brighton	Total number of feet laid	.....	302	.....	537	300	.....
	Stopcocks in same	.....	1	1	1	.....	.....
	Sums of Pipes	91	13,107	7,160	21,589	891	42,838
	Sums of Stopcocks	.....	19	13	56	4	92

Statement of the Length of different Sizes of Pipes laid, and the Number of Stopcocks put in, to May 1, 1880.

	DIAMETER OF PIPES IN INCHES.															Aggregate.
	60	48	40	36	30	24	20	16	12	10	9	8	6	4	3	
Feet of Pipe laid in Brookline, Boston Highlands, and Boston Proper	..	7,283	23,166	20,070	26,770	5,773	5,823	20,160	116,721	...	655	33,880	324,781	94,605	..	
Number of Stopcocks in same	..	6	6	8	11	11	9	45	254	...	...	105	877	416	..	
Feet of Pipe laid in Boston Highlands	...	...	...	185	109	11,427	6,200	12,130	87,226	...	916	7,167	164,706	29,314	238	
Number of Stopcocks in same	..	...	...	1	2	9	4	21	130	...	...	15	361	129	2	
Feet of Pipe laid in South Boston	...	...	...	...	...	...	13,206	....	47,564	...	105	5,156	129,331	37,170	..	
Number of Stopcocks in same	..	...	...	...	...	...	6	....	77	...	...	9	248	112	..	
Feet of Pipe laid in East Boston	..	...	...	...	...	1,463	15,972	2,152	36,715	9,923	218	23,074	86,841	6,511	..	
Number of Stopcocks in same	..	...	...	...	...	...	8	5	45	3	...	15	154	55	..	
Feet of Pipe laid in Dorchester	..	...	...	...	...	7,784	3,698	456	105,970	...	1,340	27,752	119,416	4,331	..	
Number of Stopcocks in same	..	...	...	...	...	5	2	1	125	...	...	42	237	26	..	
Feet of Pipe laid in West Roxbury	..	...	...	...	...	...	10	2,916	72,199	...	...	37,318	47,275	1,452	..	
Number of Stopcocks in same	..	...	...	...	...	...	...	1	69	...	...	45	95	14	..	
Feet of Pipe laid in Brighton	..	...	...	...	...	...	...	8,975	42,697	...	...	21,772	22,173	520	..	
Number of Stopcocks in same	..	...	...	...	...	...	...	5	58	...	...	32	52	3	..	
Feet of Pipe laid in Newton, Needham, and C. H. Reservoir, Framingham	266	16,051	1,435	1,111	2,140	...	...	20	2,043	...	...	....	360	....	..	
Number of Stopcocks in same	..	...	...	2	...	...	...	2	4	...	...	....	2	....	..	
Totals. — Length of Pipe laid	266	23,334	24,601	21,366	21,019	26,447	44,909	46,809	511,165	9,923	3,234	156,119	894,883	173,903	238	1,966,216 ft. equal to 372 miles 2,056 ft.
Number of Stopcocks put in	..	6	6	11	13	25	29	80	762	3	...	263	2,026	755	2	3,981

Statement of Service Pipes laid in 1879.

Diameter in Inches.	Boston.		South Boston.		East Boston.		Boston Highlands.		Dorchester.		West Roxbury.		Brighton.		Totals.	
	Number of Pipe.	Length in Feet.	Number of Pipe.	Length in Feet.	Number of Pipe.	Length in Feet.	Number of Pipe.	Length in Feet.	Number of Pipe.	Length in Feet.	Number of Pipe.	Length in Feet.	Number of Pipe.	Length in Feet.	Number of Pipe.	Length in feet.
1 1/4	2	45	....	....	....	....	....	....	....	....	....	....	....	....	2	45
1	9	236	....	....	....	....	1	45	4	85	....	....	1	82	15	448
3/4	6	157	....	....	....	....	3	135	....	....	3	191	....	....	12	483
5/8	207	5,870	54	1,549	26	592	190	4,362	231	6,047	216	5,184	83	2,707	1,007	26,811
Aggregate															1,036	27,787
Making total number up to May 1, 1880															45,353	

Repairs of Pipes during the Year 1879.

WHERE.	Diameter of Pipes in Inches.																	
	40	36	30	24	20	16	12	8	6	4	3	2	1½	1¼	1	¾	⅝	½	Total.
Boston	2	2	2	.	15	2	18	2	40	51	4	4	91	3	19	3	527	7	792
South Boston . . .	.	.	.	.	3	.	3	.	5	7	.	2	.	.	4	1	129	16	171
East Boston	.	.	.	2	10	.	.	.	3	3	.	.	.	.	1	.	83	2	104
Boston Highlands .	.	.	.	3	2	.	6	.	2	4	.	1	.	.	1	.	76	3	98
Dorchester	.	.	.	.	.	.	1	.	12	.	.	.	.	.	.	.	8	1	22
West Roxbury . .	.	.	.	.	.	.	3	2	4	.	.	.	1	.	.	.	5	.	15
Brighton	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	3	.	4
	2	2	2	5	30	2	31	4	66	66	4	7	92	3	25	4	831	29	1,206

Of the leaks that have occurred on pipes of 4 inches and upward: joints, 151; settling of earth, 18; defective packing, 9; defective pipe, 13; defective stop-cock, 12; cap blown off, 1; struck by pick, 1. Total	205
Stoppages by fish, 5; by gasket, 1 . . .	6
Of 3-inch and on service pipes: joints, 11; settling of earth, 160; settling of wall, 2; settling of sewer, 1; defective meter, 1; defective pipe, 52; defective coupling, 8; defective packing, 8; defective faucet, 3; coupling loose at main, 2; faucet loose at main, 2; burst by frost, 3; struck by pick, 35; by drain-diggers, 7; by nail, 1; pipes not in use, 3; cut by axe, 1; blasting, 1; stiff connections, 91; gnawed by rats, 8; Total	400
Stoppages by fish, 318; rust, 252; dirt, 6; gasket, 14; solder, 1; frost, 2; gravel, 1; lead chips, 1	595
Total	1,206

Statement of Number of Leaks and Stoppages, 1850–1879.

Year.	Diameter of.		Totals.
	Four inches and upwards.	Less than four inches.	
1850	32	72	104
1851	64	173	237
1852	82	241	323
1853	85	260	345
1854	74	280	354
1855	75	219	294
1856	75	232	307
1857	85	278	363
1858	77	324	401
1859	82	449	531
1860	134	458	592
1861	109	399	508
1862	117	373	490
1863	97	397	494
1864	95	394	489
1865	111	496	607
1866	139	536	675
1867	122	487	609
1868	82	449	531
1869	82	407	489
1870	157	769	926
1871	185	1,380	1,565
1872	188	1,459	1,647
1873	153	1,076	1,229
1874	434	2,120	2,554
1875	203	725	928
1876	214	734	948
1877	109	801	910
1878	213	1,024	1,237
1879	211	995	1,206

Hydrants.

During the year 100 hydrants have been established, and 31 abandoned.

	Established.				Abandoned.		
	Lowry.	Boston.	Y.	Post.	Boston.	Dif.	
Boston,	7	2	5	6 = 20	14	06	
So. Boston,	0	1	4	2 = 7	2	5	
East "	0	3	1	0 = 4	0	4	
Boston H'l'ds,	0	4	2	5 = 11	1	10	
Dorchester,	9	10	7	3 = 29	5	24	
W. Roxbury,	2	8	4	10 = 24	2	22	
Brighton,	0	4	1	0 = 5	0	5	
Charlestown,	0	0	0	0 = 0	7	0	
	18	32	24	26 = 100	31 = 69	76	7 = 69

Total amount up to May 1, 1880.

Boston	1,325
South Boston	486
East Boston	297
Boston Highlands	788
Dorchester	683
West Roxbury	323
Brighton	207
Deer Island	16
Brookline	8
Charlestown	3
Chelsea	8
	4,144

28 hydrants have been taken out and replaced by new or repaired ones, and 153 boxes have been taken out and replaced by new ones. The hydrants have had the usual attention paid them.

Stopcocks.

92 new stopcocks have been established this year. 75 boxes have been taken out and replaced by new ones. All the stopcocks have had the proper attention paid them.

Statement of Pipes and other Stock on hand, exclusive of Tools, May 1, 1880.

	DIAMETER IN INCHES.														
	60	48	40	36	30	24	20	16	12	10	9	8	6	4	3
Pipes	2	29	32	34	40	32	53	86	984	47	4	894	842	199	12
Blow-off Branches	.	.	.	.	3	.	1	4	2	.	.	18	.	.	.
Y Branches	.	.	.	.	1	1	1	1	.	.	.	.	.	.	.
4-Way Branches	.	.	2	1	2	8	5	13	51	.	.	34	4	.	.
3-Way Branches	.	2	9	6	4	9	3	18	29	5	36	12	32	7	.
Flange Pipe	.	.	1	1	.	1	.	2	3	.	.	.	4	1	.
Sleeves	1	16	6	11	11	28	4	3	14	11	.	8	10	10	4
Clamp Sleeves	.	6	.	2	7	.	.	.	3	.	.	.	2	.	.
Caps	1	2	2	2	4	3	3	4	4	.	.	5	6	3	.
Reducers	.	.	1	3	2	8	9	4	20	.	36	7	15	1	.
Bevel Hubs	.	.	.	.	.	.	.	.	.	.	.	.	6	3	.
Curve Pipe	.	13	.	3	22	18	.	5	17	.	.	24	17	4	.
Quarter Turns	.	.	.	2	10	4	11	11	58	2	.	47	24	3	2
Double Hubs	.	.	.	.	.	.	8	8	.	.	.	.	13	.	.
Offset Pipes	.	.	.	.	.	.	.	.	19	.	.	39	9	9	.
Yoke	.	.	.	.	.	.	.	.	10	.	.	3	16	1	.
Manhole Pipes	.	.	1	.	2	.	.	.	.	.	.	.	.	.	.
One-eighth Turns	.	.	1	2	2	9	2	17	11	6	.	59	17	3	.
Pieces of Pipe	1	.	4	2	3	4	5	1	.	.	1	.	3	4	10
Blow-off and Manhole	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.
Plugs	.	.	.	.	.	.	.	.	.	.	.	.	10	4	.
Thawing Clamps	.	.	.	.	.	.	.	.	23	.	.	7	12	12	.
Straps	.	.	.	.	.	.	.	.	.	.	.	.	2	1	.
Branch Openings	.	.	4	.	18	3	.	.	.	.	.	.	.	.	.
Stopcocks	.	.	1	1	2	1	1	7	5	.	.	11	29	17	.
Manhole Branches	.	.	.	.	4	.	.	.	.	.	.	.	.	.	.

Lowry Hydrants. — 38 Lowry hydrants, 2 barrels, 51 rubber valves, 46 gaskets, 10 chucks, 130 bolts, 13 extensions, 19 wastes, 20,049 lbs. special castings.

Post Hydrants. — 26 post hydrants, 4 barrels, 18 pot valves, 118 bolts, 78 gaskets, 12 rubber valves, 14 bottom extensions, 2,159 lbs. special castings.

Boston Hydrants. — 15 Boston hydrants, 105 straps, 75 wastes, 26 extensions, 6,062 lbs. special castings.

Boston Y Hydrants. — 18 Boston Y hydrants, 1 Y top, 3 pots, 19 gaskets, 18 bolts, 21 rubber valves.

For Stopcocks. — 1 4-inch screw for waste weir, 1 do. for Brookline reservoir, 2 16-inch check valves, 7 2½-inch screws for goosenecks, 6 2½-inch valves, 299 lbs. comp. castings, 51 bolts, 108 lbs. washers, 386 lbs. comp. nuts, 349 mallable nuts.

Meters in Shop. — 2 3-inch, 10 2-inch, 1 1½-inch, 2 1-inch, 44 ⅝-inch.

Stock for Meters. — 8 1-inch cocks, 19 ⅝-inch do., 5 1-inch clocks, 75 rubber nipples, 4 2-inch connection pieces, 3 1-inch do., 6 ⅝ inch do., 5 4-inch fish-boxes, 9 3-inch do.

For Service Pipe. — 1 2½-inch female coupling, 2 2½-inch air-cocks, 38 2-inch nipples, 33 2-inch male couplings, 69 2-inch tubes, 65 2-inch nuts, 7 1½-inch union cocks, 12 1½-inch tubes, 6 1½-inch nuts, 17 1¼-inch union cocks, 50 1¼-inch T cocks, 30 1¼-inch male couplings, 43 1¼-inch nuts, 32 1¼-inch tubes, 53 1-inch union cocks, 3 1-inch T cocks, 49 1-inch sidewalk cocks, 32 1-inch crooked cocks, 12 1-inch air-cocks, 86 1-inch male couplings, 211 1-inch nuts, 175 1-inch tubes, 3 1-inch air-plugs, 40 ¾-inch union cocks, 47 ¾-inch T cocks, 5 ¾-inch crooked cocks, 32 ¾-inch sidewalk cocks, 84 ¾-inch male couplings, 74 ¾-inch nuts, 88 ¾-inch tubes, 508 ⅝-inch straight cocks, 137 ⅝-inch crooked cocks, 16 ⅝-inch T cocks, 14 ⅝-inch thawing cocks, 60 ⅝-inch solder cocks, 7 ⅝-inch right angle cocks, 6 ⅝-inch left angle cocks, 151 ⅝-inch sidewalk cocks, 24 ⅝-inch Y cocks, 33 ⅝×½-inch tubes, 408 ⅝-inch tubes, 781 ⅝-inch nuts, 74 ⅝-inch male couplings, 42 ⅝-inch thawing couplings, 155 ⅝-inch plugs, 44 ½-inch union cocks, 10 ½-inch crooked cocks, 77 ½-inch nuts, 64 ½-inch tubes, 12 4-inch thimbles, 4 3-inch thimbles, 11 4×2 composition reducers, 5 3×2 ditto, 1 2½×2 ditto, 1 4×2 2 way ditto, 28 2×1 ditto.

Lead Pipe. — 255 lbs. 3-inch pipe, 1,454 lbs. 2-inch ditto, 1,898 lbs. 1½-inch pipe, 767 lbs. 1¼-inch pipe, 352 lbs. 1-inch tin lined pipe, 1,025 lbs. ¾-inch lead pipe, 581 lbs. ¾-inch tin lined pipe, 2,288 lbs. ⅝-inch lead pipe, 812 lbs. ⅝-inch tin lined pipe, 558 lbs. ½-inch lead pipe, 66 lbs. solder.

Blacksmith Shop. — 341 lbs. cast steel, 87 lbs. spring steel, 52 lbs. tire steel, 79 lbs. calking steel, 1,695 lbs. refined iron, 1,119 lbs. Norway iron, 332 lbs. horseshoes, 39 lbs. horse nails, 61 pick blanks.

Carpenter's Shop. — 10 lowry hydrant boxes, 23 post ditto, 29 Boston ditto, 19 Boston Y ditto, 39 stopcock boxes, 1 meter box, 42,800 feet spruce, 300 feet pine boards, 160 feet maple, 90 feet oak, 36 feet ash.

Tools. — 1 steam-engine, 1 large hoisting-crane, 3 boom derricks, 8 hand-geared ditto, 8 set of shears and rigging for same, 8 tool-houses, 4 tool-boxes, 7 nozzles, 2 platform scales, 1 portable blacksmith shop, 1 portable cover for Brewer fountain, 1 hand roller, 2 horse ditto, tools for laying main and service pipes, 2 engine lathes, 1 foot ditto, 1 hand ditto, 1 Pratt and Whitney ditto, 1 planer, 1 boring mill, 1 chain hoisting gear, 1 upright drilling-machine, 4 grindstones, 1 trip hammer, the necessary tools for carrying on the machine, blacksmith, carpenter, and plumbing shops, 1 circular saw, 1 fan-blower, 1 40-inch proving press, 1 36-inch ditto, 1 small ditto, 9 wheelbarrows, 3 handbarrows, also a lot of patterns at foundry where we obtain castings.

Stable. — 13 horses, 13 wagons, 2 buggies, 6 pungs, 1 sled, 2 sets runners, 2 carts, 17 sets harness, 30 blankets, 3 buffalo robes, 3 tons hay, 40 bushels grain, 1 jigger, 4 lap robes, 2 hay-cutters.

Beacon Hill Reservoir. — 1 large composition cylinder, 1 16-inch jet, 1 6-inch composition jet, 3 composition plates, 9 cast-iron plates, 2 4-inch composition jets, 5 swivel pipe patterns, 1 2-inch copper straight jet, 6 composition jets for small fountains.

Miscellaneous. — 18,427 lbs. pig lead, 360 lbs. gasket, 1 fountain basin, 1 stone trough for drinking fountain, 130 cords of wood, 1 thawing boiler, 1 hose carriage, 1 garden pump, 60 3-inch earthen pipe, 120 lbs. new rope, 1,000 paving bricks, 1 ton sand, 160 tons gravel, 47 gallons kerosene oil, 20 gallons linseed oil, 24 lbs. waste, 7 bbls. cement, lot of old bolts.

Respectfully submitted,

E. R. JONES.

Superintendent Eastern Division.

REPORT OF THE SUPERINTENDENT OF THE MYSTIC WATER WORKS.

Charlestown District, Boston, May 1, 1880.

Leonard R. Cutter, Esq., *Chairman of Boston Water Board:* —

Sir, —The annual report of this department for the year ending April 30, 1880, is herewith respectfully submitted.

The works are, as a whole, in very good condition. At the lake the removal of the bank of gravel on the westerly side, adjoining the entrance from Mystic street, has been finished, the gravel all being used to fill up the area on the south-westerly side of the dam. This area has, with that on the hill, been graded off, trees set out, and the whole sown to grass, making a great improvement, that will be more apparent probably as the season advances. The new road from Mystic street to the dam has also been graded and completed. A new and substantial stone wall, 250 feet in length, has been built along the front line of the lot on the upper side of Mystic street, with materials on hand. The bridge over the over-fall at the dam has been thoroughly repaired, having new inside stringers, and a new covering of southern pine plank. Advantage was taken of the low level of the water in November, to clear up the area at Mystic Station in Winchester, usually covered with water, a large amount of muck having been wheeled out and deposited along the shore, thus giving a greater depth of water.

Mystic sewer is now in complete working order, and two men are constantly employed in looking after it, and also the branch connections and cesspools.

Conduit.

In October and November the section of the conduit between the lake and ventilator, in which there has always been a heavy growth of vegetable matter, was thoroughly cleaned and flushed. An examination at this time showed the conduit to be in good condition, there having been no material change since the last report.

PUMPING-STATION.

The pumps and boilers, which have all been in use more or less during the year, have required but the usual repairs.

The engines are kept in excellent working order, but owing to the constant work required of them they now need thorough outside repairs and repainting. The engine-room is considerably out of repair, and needs a thorough renovating and repainting at once.

The grounds about the engine-house are in good condition, and present a neat appearance. The 100 spruce trees, with a number of other kinds which were set out a year ago, are all, with four or five exceptions, in a flourishing condition, the transplanting proving a success. The dwelling-houses and stable are in very good condition.

The coal account for the year is as follows: —

Amount on hand May 1, 1879,	305.79	tons.
Received from May 1, 1879, to May 1, 1880.	3509.60	"
Total	3815.39	"
Consumed from May 1, 1879, to May 1, 1880,	3559.64	"
On hand	255.75	"

FORCE MAINS.

These mains have both been in constant use during the year, and, beyond a slight joint leak on the old main last month, they have required no repairs. The new roadway on the line of these mains from South to West street is being gradually graded with ashes, and other proper material that is found on the works. A drain pipe was laid through this new roadway, from the entrance to the reservoir grounds on South street, to West street, there connecting with a drain already laid. This was laid with old 8-inch water-pipe, that had been replaced in the city, and gives, what was much needed, a direct drainage from the reservoir to Mystic river.

RESERVOIR.

The reservoir and the grounds adjacent are in very good condition. A year ago the lawn and the bank on the northeasterly side, which had been broken up more or less the previous year in laying the new force main, were being regraded and sodded or sown to grass, and as a result at the present time present a very good appearance. The road-way on this side has been regraded and rolled. Since the first of December the water in the reservoir, like that in the lake,

has been excellent, the screens in the gate-house showing scarcely any sediment whatever. The inside of the gate-house will need renovating, and the screens in the effluent chambers connecting with the two supply mains to the city will need renewing the present season.

Supply Mains.

On the 30-inch wrought-iron and cement main no repairs were needed during the year. On the 24-inch cast-iron main there was a slight joint leak, otherwise no repairs were required, and the mains are no doubt in good condition.

Distribution Pipes.

In this district the distribution pipes have been extended 408 feet, and 17,183 feet have been relaid, all with iron pipe. Of the amount relaid 15,453 feet was with larger pipe, and the balance, 1,730 feet, with pipe of the original size. Of the amount that was enlarged 36 feet was from 2 to 3 inches, 228 feet from 2 to 4 inches, 4,408 feet from 4 to 6 inches, 12 feet from 4 to 10 inches, 282 feet from 6 to 8 inches, 2,758 feet from 6 to 10 inches, 3,444 feet from 6 to 12 inches, 1,494 feet from 8 to 10 inches, and 2,791 feet from 8 to 12 inches. There have been 13 additional hydrants located, viz. : 4 Lowry and 9 Post. One flush hydrant has been replaced with a Lowry. There have been 48 breaks and leaks on the cement pipes during the year. In Chelsea the distribution pipes have been extended 24 feet, in Somerville 248 feet, and in Everett 252 feet.

Service Pipes.

The number of new service pipes entered during the year was 71. There were 23 tin-lined pipes changed to lead, 43 pipes lowered, 5 enlarged, and 15 "V" branches changed to single services. There were 29 stoppages on the service pipes, of which 18 were caused by fish, 9 by rust, and 2 by frost. 651 service boxes have been renewed.

In the following tables will be found the number of feet of pipe laid and relaid during the year, also the amount now connected with the works, and the stock on hand May 1, 1880.

Respectfully submitted,

CHARLES H. BIGELOW,
Superintendent.

Distribution Pipes Relaid in Charlestown in 1879–80.

Streets.	Original Size.	Size of Pipe.							Kind of Pipe.
		3 in.	4 in.	6 in.	8 in.	10 in.	12 in.	16 in.	
		Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	
Tufts	4 inch.	...	36	756	...	...	...	...	Iron.
Princeton	4 "	...	...	174	...	...	...	...	"
Hull	2 "	...	204	...	...	...	...	...	"
Clark's Court	2 "	27	...	...	...	...	...	...	"
Bunker Hill	6 "	...	...	624	128	...	...	...	"
Decatur	4 "	...	24	960	...	...	...	...	"
Bainbridge	4 "	...	...	318	...	...	...	...	"
Perry	4 "	...	24	...	...	...	...	...	"
Chauncy Place	2 "	...	24	...	...	...	...	...	"
Tremont	6 "	...	...	...	...	528	...	...	"
Bartlett	6 "	...	24	12	...	1,524	36	...	"
Chelsea	6 "	...	36	180	36	...	3,408	...	"
Lynde	4 "	...	...	1,128	...	12	...	...	"
Mt. Vernon	4 "	...	36	1,020	...	...	...	...	"
Auburn	6 "	...	...	...	72	706	...	...	"
Middlesex	4 "	...	24	...	...	...	...	...	"
Main	16 "	...	...	...	...	...	...	34	"
Pearl	8 "	...	...	...	...	...	1,458	...	"
Summer	4 "	...	...	40	...	...	...	...	"
High	6 "	...	...	...	46	...	...	...	"
Salem	8 "	...	...	...	...	...	325	...	"
Salem Avenue	4 "	...	12	...	...	...	...	...	"
Winthrop	8 "	...	...	8	...	1,488	...	...	"
Chestnut	4 "	...	...	12	...	...	...	...	"
Monument Court	4 "	...	24	...	...	...	...	...	"
Wallace Court	4 "	...	36	...	...	...	...	...	"
Adams	8 "	...	...	...	8	...	...	...	"
Warren	8 "	...	...	...	36	...	...	...	"
Lexington	8 "	...	...	...	...	6	1,008	...	"
Concord Avenue	2 "	9	...	...	...	...	...	...	"
City Square	6 "	...	...	288	...	...	...	...	"
Union	6 "	...	...	24	...	...	...	...	"
Moulton	6 "	...	...	144	...	...	...	...	"
Parker	6 "	...	...	72	...	...	...	...	"
Chemical Works	4 "	...	24	...	...	...	...	...	"
Totals.		36	528	5,760	326	4,264	6,235	34	

Extension of Distribution Pipes in Charlestown in 1879–80.

Streets.	Size of Pipe.		Kind of Pipe.	Total Feet.
	4 inch.	6 inch.		
Union Court	168	. . . . .	Iron.	168
Washington Square	108	. . . . .	"	108
Lexington Avenue	18	. . . . .	"	18
Mystic W.W. Pipe Yard . . .	36	. . . . .	"	36
Decatur	. . . . .	06	"	06
Cambridge	72	. . . . .	"	72
Totals	402	06		408

Service Pipes Laid in Charlestown in 1879–80.

Size.	½ inch.	⅝ inch.	¾ inch.	1 inch.	1½ inch.	2 inch.	Total No.	Total Feet.
Number	28	36	2	3	1	1	71	1,706

CHARLESTOWN.	Relaid	1,730 feet.
	Relaid and enlarged	15,453 "
	Extension	408 feet.
	Laid previous	154,190 "
	Aggregate	154,598 feet, or 29 miles, 1,478 feet.
CHELSEA.	Extension	24 "
	Laid previous	149,339 "
	Aggregate	149,363 feet, or 28 miles, 1,523 feet.
SOMERVILLE.	Extension	248 "
	Laid previous	236,405 "
	Aggregate	236,653 feet, or 44 miles, 4,333 feet.
EVERETT.	Extension	252 "
	Laid previous	75,772 "
	Aggregate	76,024 feet, or 14 miles, 2,104 feet.
ENGINE-HOUSE GROUNDS, SOMERVILLE.	Laid previous	287 feet.

Total amount of distribution pipe May 1, 1880, 116 miles, 4,445 feet.

Summary of Pipes, Gates, and Hydrants connected with the Works, May 1, 1880.

Pipes.	36 inch.	30 inch.	24 inch.	20 inch.	16 inch.	12 inch.	10 inch.	8 inch.	6 inch.	4 inch.	3 inch.	2 inch.
Iron	974	7,354	16,867	200	14,512	11,527	8,253	11,776	20,810	11,841	21,456	666
Cement	.....	17,515	.....	3,980	6,916	12,042	20,483	63,414	179,527	287,026	31,190	9,564

Aggregate . . . . . { 757,893 feet, or 143 miles and 2,853 feet.

Gates.	30 inch.	24 inch.	20 inch.	16 inch.	12 inch.	10 inch.	8 inch.	6 inch.	4 inch.	3 inch.	Total.
	11	7	4	21	43	41	104	350	482	65	1,128

Hydrants.	Charlestown.	Chelsea.	Somerville.	Everett.	Medford.	Total.
Lowry	169	.....	3	1	.....	173
Flush	34	5	26	.....	5	68
Post	35	131	253	68	5	494
	238	136	282	69	10	735

CIVIL ORGANIZATION OF THE WATER WORKS, FROM THEIR COMMENCEMENT, TO MAY 1, 1880.

Water Commissioners.

Nathan Hale, James F. Baldwin, Thomas B. Curtis. From May 4, 1846, to January 4, 1850.

Engineers for Construction.

John B. Jervis, of New York, Consulting Engineer. From May, 1846, to November, 1848.

E. S. Chesbrough, Chief Engineer of the Western Division. From May, 1846, to January 4, 1850.

William S. Whitwell, Chief Engineer of the Eastern Division. From May, 1846, to January 4, 1850.

City Engineers having Charge of the Works.

E. S. Chesbrough, Engineer. From November 18, 1850, to October 1, 1855.

George H. Bailey, Assistant Engineer. From January 27, 1851, to July 19, 1852.

H. S. McKean, Assistant Engineer. From July 19, 1852, to October 1, 1855.

James Slade, Engineer. From October 1, 1855, to April 1, 1863.

N. Henry Crafts, Assistant Engineer. From October 1, 1855, to April 1, 1863.

N. Henry Crafts, City Engineer. From April 1, 1863, to November 25, 1872.

Thomas W. Davis, Assistant Engineer. From April 1, 1863, to December 8, 1866.

Henry M. Wightman, Resident Engineer at C. H. Reservoir. From February 14, 1866, to November, 1870.

A. Fteley, Resident Engineer on construction of Sudbury-river works, from May 10, 1873, to April 7, 1880.

Joseph P. Davis, City Engineer. From Nov. 25, 1872, to March 20, 1880.

Henry M. Wightman, City Engineer. From April 5, 1880, to present time.

After January 4, 1850, Messrs. E. S. Chesbrough, W. S. Whitwell, and J. Avery Richards were elected a Water Board, subject to the direction of a Joint Standing Committee of the City Council, by an ordinance passed December 31, 1849, which was limited to keep in force one year; and in 1851 the Cochituate Water Board was established.

Cochituate Water Board.

Presidents of the Board.

Thomas Wetmore, elected in 1851, and resigned April 7, 1856‡ . . . . . Five years.

John H. Wilkins, elected in 1856, and resigned June 5, 1860‡ . . . . . Four years.

Ebenezer Johnson, elected in 1860, term expired April 3, 1865‡ . . . . . Five years.

Otis Norcross, elected in 1865, and resigned January 15, 1867 . . . . . One year and nine months.

John H. Thorndike, elected in 1867, term expired April 6, 1868‡ . . . . . One year and three months.
Nathaniel J. Bradlee, elected April 6, 1868, and resigned January 4, 1871 . . . Two years and nine months.
Charles H. Allen, elected January 4, 1871, to May 4, 1873 . . . . . Two years and four months.
John A. Haven, elected May 4, 1873, to Dec. 17, 1874‡ . . . . . One year and seven months.
Thomas Gogin, elected Dec. 17, 1874, and resigned May 31, 1875 . . . . . Six months.
L. Miles Standish, elected August 5, 1875, to July 31, 1876 . . . . . One year.

Members of the Board.

Thomas Wetmore, 1851, 52, 53, 54, and 55‡ . .	Five years.
John H. Wilkins, 1851, 52, 53, *56, 57, 58, and 59‡ .	Eight years.
Henry B. Rogers, 1851, 52, 53, *54, and 55 . .	Five years.
Jonathan Preston, 1851, 52, 53, and 56 . . .	Four years.
James W. Seaver, 1851‡	One year.
Samuel A. Eliot, 1851‡	
John T. Heard, 1851	One year.
Adam W. Thaxter, Jr., 1852, 53, 54, 55‡ . . .	Four years.
Sampson Reed, 1852 and 1853	Two years.
Ezra Lincoln, 1852‡	One year.
Thomas Sprague, 1853, 54, and 55‡	Three years.
Samuel Hatch, 1854, 55, 56, 57, 58, and 61 . . .	Six years.
Charles Stoddard, 1854, 55, 56, and 57‡ . . .	Four years.
William Washburn, 1854 and 55	Two years.
Tisdale Drake, 1856, 57, 58, and 59‡	Four years.
Thomas P. Rich, 1856, 57, and 58‡	Three years.
John T. Dingley, 1856 and 59‡	Two years.
Joseph Smith, 1856‡	Two months.
Ebenezer Johnson, 1857, 58, 59, 60, 61, 62, 63, and 64‡	Eight years.
Samuel Hall, 1857, 58, 59, 60, and 61‡ . . .	Five years.
George P. French, 1859, 60. 61, 62, and 63 . . .	Five years.
Ebenezer Atkins, 1859‡	One year.
George Dennie, 1860, 61, 62, 63, 64, and 65 . . .	Six years.
Clement Willis, 1860	One year.
G. E. Pierce, 1860‡	One year.
Jabez Frederick, 1861, 62, and 63‡	Three years.
George Hinman, 1862, and 63	Two years.
John F. Pray, 1862	One year.
J. C. J. Brown, 1862	One year.
Jonas Fitch, 1864, 65, and 66	Three years.
Otis Norcross, *1865, and 66	Two years.
John H. Thorndike, 1864, 76, 66, and 67‡ . . .	Four years.
Benjamin F. Stevens, 1866, 67, and 68	Three years.
William S. Hills, 1867	One year.
Charles R. Train, 1868	One year.
Joseph M. Wightman, 1868, 69	Two years.
Benjamin James, *1858, 68, and 69	Three years.
Francis A. Osborn, 1869	One year.
Walter E. Hawes, 1870‡	One year.
John O. Poor, 1870	One year.
Hollis R. Gray, 1870	One year.
Nathaniel J. Bradlee, 1863, 64, 65, 66, 67, 68, 69, 70, and 71	Nine years.
George Lewis, 1868, 69, 70, and 71	Four years.
Sidney Squires, 1871	One year.

CHARLES H. HERSEY, 1872	One year.
CHARLES H. ALLEN, 1869, 70, 71, and 72	Four years.
ALEXANDER WADSWORTH, *1864, 65, 66, 67, 68, 69, and 72	Seven years.
CHARLES R. MCLEAN, 1867, 73, and 74	Three years.
EDWARD P. WILBUR, 1873 and 74	Two years.
JOHN A. HAVEN, 1870, 71, 72, 73, and 74‡	Five years.
THOMAS GOGIN, 1873, 74, and 75*	Three years.
AMOS L. NOYES, 1871, 72, and 75	Three years.
WILLIAM G. THACHER, 1873, 74, and 75	Three years.
CHARLES J. PRESCOTT, 1875	One year.
EDWARD A. WHITE, 1872, 73, 74, 75, and 76†	Five years.
LEONARD R. CUTTER, 1871, 72, 73, 74, 75, and 76†	Six years.
L. MILES STANDISH, 1860, 61, 63, 64, 65, 66, 67, 74, 75, and 76†	Ten years.
CHARLES E. POWERS, *1875 and 76†	Two years.
SOLOMON B. STEBBINS, 1876†	One year.
NAHUM M. MORRISON, 1876†	One year.
AUGUSTUS PARKER, 1876†	One year.

*Mr. John H. Wilkins resigned Nov. 15, 1855, and Charles Stoddard was elected to fill the vacancy. Mr. Henry B. Rogers resigned Oct. 22, 1865. Mr. Wilkins was re-elected Feb., 1856, and chosen President of the Board, which office he held until his resignation, June 5, 1860, when Mr. Ebenezer Johnson was elected President; and July 2, Mr. L. Miles Standish was elected to fill the vacancy occasioned by the resignation of Mr. Wilkins. Otis Norcross resigned Jan. 15, 1867, having been elected Mayor of the city. Benjamin James served one year, in 1858, and was reëlected in 1868. Alexander Wadsworth served six years, 1864–69, and was reëlected in 1872. Thomas Gogin resigned May 31, 1875. Charles E. Powers was elected July 15 to fill the vacancy occasioned by the resignation of Mr. Gogin.

† Served until the organization of the Boston Water Board.

‡ Deceased.

Boston Water Board, *Organized July 31, 1876.*

Timothy T. Sawyer, from July 31, 1876, to May 5, 1879.
Leonard R. Cutter, from July 31, 1876, to present time.
Albert Stanwood, from July 31, 1876, to present time.
Francis Thompson, from May 5, 1879, to present time.

Organization of Board for year 1879–80.

Chairman.
Leonard R. Cutter.

Clerk.
Walter E. Swan.

Superintendent of the Eastern Division of Cochituate Department.
Ezekiel R. Jones.

Superintendent of the Western Division of Cochituate Department.
Desmond Fitzgerald.

Superintendent of Mystic Department.
Charles H. Bigelow.

Water Registrar of the Cochituate Department.
William F. Davis.

Water Registrar of the Mystic Department.
Joseph H. Caldwell.

City Engineer.
Henry M. Wightman.

SHELF No.....

[July, 1880, 10,000]

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